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Gaylord Starts $6,000,000 Expansion Plan

Comprehensive Program of Improvement Announced By Gaylord Container Corp. For 1941 Includes Much Additional Equipment For Pulp Mill — New Line of White Bag Papers To Be Added.

In a statement issued by Vertrees Young, executive vice-president, it was disclosed that plans are now practically complete for the expansion and improvement program to be carried out during 1941 in the pulp and paper mill and bag plant of the Gaylord Container Corporation at Bogalusa, La. The program in its entirety will involve an expenditure approximating six million dollars.

In the mill division the principal items in the program will include a plant for bleaching sulphate pulp, with necessary additions to the pulp mill to supply the added pulp requirements and substantial additions to the power plant to furnish the increased steam and electricity required. One fourdrinier and one cylinder machine will be completely equipped to manufacture fourdrinier and cylinder bleached papers, boards, and specialties.

Additional Equipment for Pulp Mill

Additional equipment to be installed in the pulp mill will include chip screens, digesters, washers, evaporators, a recovery unit, lime slakers, white liquor clarifier, screens, knotters and thickeners. Swenson Evaporator Company will furnish pulp washers and evaporators. Combustion Engineering Company will install the recovery unit. In the power house new Riley boilers and a Westinghouse turbine will be installed. E. H. Barry of Boston, Mass., is consulting engineer on power plant improvements.

To Add Complete White Wrapping Line

These additions will enable the mill to add to its present line of products a complete line of white bag and wrapping papers, white butcher's papers, folding carton boards, boards for the manufacture of paraffined ice cream and butter cartons, tags and folder stocks, solid white and white lined container boards, and many other full-bleached and semi-bleached specialties. In fact this new line is planned to be the major part of the mill expansion, as the volume of liner board is not expected to be greatly changed and the increase in paper production is only planned to balance the added bag production with its corresponding paper requirements.

A new high speed fourdrinier machine will be installed in a building bordering on Columbia Street directly east of the present No. 6 paper machine room. The new machine now being built by Beloit Iron Works will be constructed for an operating speed of 1500 ft. per minute and a trim of 196 inches, and will be fitted primarily to produce bag paper, wrapping paper and specialties. It will also be capable of producing board equally satisfactorily, and is expected to be the last word in paper making equipment.

Extensive additions and improvements to other machines will be made in the interest of the production of new grades of boards and papers on these machines, and further improvement of quality and volume. Additional equipment in the finishing room and a new warehouse will be provided to take care of the new production, and it is expected that the program in its entirety will make the Bogalusa operation one of the outstanding mills in the country.

Will Build New Bag Plant

In the Bag Division, due to the tremendous increase in the sale of Gaylord bags, it is again necessary to build a new bag plant. The present bag plant has been temporarily housed in a plant adjacent to the box plant roll-stock warehouse, and was designed to be convertible into additional warehouse space when desired. It is now planned to construct directly south of the box factory a two-story building designed expressly for the production and storage of bags. New bag machines will be added for the production of grocery bags and sacks, and greatly enlarged facilities will be provided for shipping as well as manufacture and storage.

Work is already under way on several of the new additions and will be pushed rapidly throughout the coming year. Several hundred men will be directly and indirectly employed during the course of the year in the various trades connected with the erection of buildings and the installation of equipment. It is expected that permanent employment will be given to something short of 200 additional men and women

(Continued on page 22)

Paper Mill Employment Increased in 1940

Wisconsin Industrial Commission Reports Number of Workers Up 6.5 Per Cent and Payrolls Rose 8.5 Per Cent In First 11 Months of 1940—Many Dams Built In Last Two Years—Other Mill News.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., January 6, 1941—Resumption of production in some of Wisconsin's idle pulp mills during the last year to help overcome the shortage of European raw materials is reflected in the upturn of production recorded by the Wisconsin Industrial Commission for the first 11 months of 1940, in comparison with the twelve months of 1939.

In the manufacture of paper and allied products for the state as a whole, the number of workers on the payrolls was stepped up from 20,300 in 1939 to 21,600 in 1940, an increase of 6.5 per cent. Increases in wages granted in numerous mills were responsible for a larger gain in estimated weekly payrolls than in number of workers added. The increase was from $518,000 to $562,000, or 8.5 per cent. Average weekly earnings are now $25.97, as compared with $25.50 in 1939.

Employee-hours worked per week have risen from 865,000 in 1939 to 877,000 in 1940, a gain of 1.5 per cent. The wage-hour regulations had a downward effect, however, showing an average work week of 40.6 hours in 1940, compared to 42.6 in 1939.

Payrolls Drop Slightly Last Fall

The fall months, however, have shown a slight tapering off, with the estimated number of wage earners dropping from 22,200 in September to 21,900 in November, a decline of 0.4 per cent for the three-month period. Estimated weekly payrolls declined from $589,000 in September to $579,000 in November, a drop of 1.4 per cent. The average amount earned per worker per week for the three-month period was $26.45 for 40.7 hours, at an average hourly rate of 65 cents.

Printing, publishing and allied industries have followed about the same yearly trend, showing 9,300 wage earners in 1939, 9,600 in the first eleven months of 1940, and an increase of 2.6 per cent. Weekly payrolls are up 3.7 per cent, from $309,000 in 1939 to $321,000 in 1940, with the employee-hours per week gaining 4.6 per cent, from 356,000 hours in 1939 to 373,000 hours in 1940. Average weekly earnings are $33.46 as against $33.09 last year. Average hours worked per week are 38.9, as compared with 38.2 last year. For the months of September, October and November of this year, the number of workers dropped 0.1 per cent, weekly payrolls are down 0.2 per cent, and the average weekly wage is $33.53 for 39.2 hours per week. The average hourly wage rate is 85.4.

Nekoosa Foundry Reports More Demand

Improved demand is shown by the Nekoosa Foundry and Machine Works, Inc., Nekoosa, Wis., according to M. J. Power, general manager.

"Our business from a standpoint of volume shows an improvement over 1939," declares Mr. Power. "During the early months of the year the demand for paper mill equipment was a little slow but steady operation of pulp and paper mills during the year has brought about an increased need for new equipment to speed up production. We have shared this improved activity and our volume of business has been very good for the last six months of this year.

"During the past few years we have developed a special cast beater bar which is meeting with acceptance among paper mills and we expect an increasing volume on these in the future.

"No additions have been made to plant and equipment. Both have been kept in excellent condition and we are in position to handle considerably more business without further expansion.

"Conditions in all industries change rapidly these days but present indications are that 1941 should perhaps be a better year from a business angle than the year just ended."

Many Dams Built in Last Two Years

Construction of 37 dams, some of them on the Fox and Wisconsin Rivers in the paper mill area, took place in the last two years, according to the report issued recently by the Wisconsin Public Service Commission, which now has more than 1,000 dams in Wisconsin under its jurisdiction. Some of these were built to create storage reservoirs to furnish adequate power flow in drought periods. Plans have been passed upon by the commission for 87 hydraulic structures.

The largest project is the new hydro-electric development of the municipal utility at Kaukauna, Wis. on the Fox River, the cost exceeding $400,000. Utilizing the power site of the former Patten Paper Company, the city has built a dam 2,425 feet long, plus 90 feet of sluice gates. The new power plant at this location has a 2,400 kilowatt generator which at capacity will generate 1,728,000 kilowatts per month. The dam is designed to handle 42,000 cubic feet of water per second, with three sluice gates, each capable of discharging 18,000 cubic feet per second

The Kaukauna plant was operated for the first time December 31 and is now furnishing current steadily. This will enable the Sangamon Paper Grading Company, Chicago, to begin operations soon on one paper machine in the former Patten mill, which was purchased recently from the city for $4,000 under a contract to furnish local employment in Kaukauna. Renovation is about completed. One paper machine has been wired for power and two of the mill's three boilers have been retubed.

The Wisconsin Public Service Commission is awaiting a decision from the United States Supreme Court concerning jurisdiction over a dam on the Wisconsin River at Tomahawk, Wis., which is being reconstructed by the Wisconsin Public Service Corporation. Federal attorneys contend the river at this point is a navigable stream and the project there comes under control of the Federal Power Commission. The outcome also is awaited of the Supreme Court's decision on a case involving the control and

regulation of the New River in Virginia, as the decision will have an important bearing on state or federal control of power dams.

Seek to Protect Industry from "Dumping"

U. S. Senator Alexander Wiley of Chippewa Falls, Wis., is supporting efforts to secure federal legislation to protect the American pulp and paper industry from the possible "dumping" of cheap European products after the present war is ended.

The senator has written to J. M. Conway, president and general manager of the Hoberg Paper Mills, Inc., Green Bay, Wis., and to Alex Schoen of Green Bay, president of the Tri-State District Council of the International Brotherhoods of Pulp, Sulphite and Paper Mill Workers, stating:

"I believe that American standards of living for the workingmen in our paper mills and the stability of the pulp and paper industry might be seriously threatened if our American markets were flooded with low cost post-war pulp and paper imports."

Cannard to Move to New Plant

The Cannard Manufacturing Company expects to move from Green Bay, Wis., to its new plant at Little Chute, Wis., this week. The company manufactures paper converting machines and will employ about twenty persons. The building was financed by the Little Chute Business Association, and is of concrete block construction It is one story, 60 by 127 feet in size.

Reforestation Work Yielding Returns

Reforestation in Douglas County, Wisconsin, has begun to yield returns. Roy Guest, county forester, announces that $1,000 worth of jack pine pulpwood has been cut in two townships for sale to paper mills.

Pulp Shipments to Germany Slow

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., January 4, 1941—Shipments from Sweden to Germany under the global contract concluded last summer are still slow, according to a report from the Assistant Trade Commissioner, Stockholm. Contributory factors for this are that the previously large fleet of German ships in the Baltic has been almost completely withdrawn, and that the freights offered by the German buyers for pulp cargoes have not proved acceptable to Swedish ships. It is now reported, however, that the Germans are apparently making energetic efforts to have all the pulp bought under the global contract shipped before the end of the shipping season.

Chas. S. Bassett Co. Expands

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., January 6, 1941—The Chas. S. Bassett Company has removed to larger quarters in the same building at 10 High street. The company has engaged a new salesman, George A. Pinkham, as representative in Maine, with an office in Portland.

Since starting in business, the Chas. S. Bassett Company has concentrated solely on cordage and twine, but has recently taken on a complete line of high quality gummed tape so that they may more completely satisfy their customers' requirements.

West Dudley Paper Mill Burns

[FROM OUR REGULAR CORRESPONDENT]

WEST DUDLEY, Mass., January 6, 1941—With a loss estimated at $250,000, the main plant of the West Dudley Paper Company Division of the Rhode Island Card Board Company, Pawtucket, R. I., was destroyed by fire January 5 and was under control at midnight, 20 hours after the flames were discovered.

The fight of the firemen saved from destruction the office of the plant with its records and other valuables and a power-house. Firemen from the towns of Webster and Southbridge were among the fighters of the flames.

Losses included two steam electric turbines valued at $30,000 each, paper machines valued at $50,000, stock and fabricated products. Late on the night of January 5, the paper and wood pulp kept the plant a roaring inferno despite tons of water pumped from the Quinebaugh River throughout the day and night.

Hundreds of tons of paper and wood pulp fell into the basement as floors collapsed. Wrecking crews were called to raze sections of the cement and tile walls so firemen could pour water on the blazing mass.

A passerby discovered the fire, but the flames had already gained headway and spread with such speed that the building was doomed before firemen arrived.

The plant was a rambling one-story building covering a large area. Ninety persons were employed.

Lowell Emerson, president of the company and owner of the property, said last night that plans for re-building were already being considered.

Paper Bought Under Walsh-Healey Act

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Jan. 8—1941—During the week ended December 21, the Government purchased $62,845.10 worth of paper and allied products under the Walsh-Healey Act as follows: $10,705.00 worth of Templet paper for Navy, S&A, from R. P. Andrews Paper Company, Washington, D. C.; $10,089.50 worth of guide cards for War, QMC, Brooklyn, from Goldsmith Bros., N.Y.C.; $18,550.50 (a) worth of mimeograph paper for Agriculture, Purch. Sales & Traffic, from The Whitaker Paper Company, Baltimore, Md.; and $23,500.10 worth of paper for War, QMC, Brooklyn, from The Whitaker Paper Company, Baltimore, Md.

(a) Indefinite contract other than General Schedule. Purchases to be made if and when needed.

Walker-Goulard-Plehn Give Bonus

Walker-Goulard-Plehn Company, Inc., 448-50 Pearl street, New York, this year gave to their employees a very substantial Christmas bonus ranging from a minimum of two week's salary to a month's salary. All of those who have been with the Company for more than one year, received premiums ranging from a month's pay, depending upon the number of years of service in the Company.

In addition to this, the stockholders were surprised to receive very substantial dividends for Christmas. besides their regular quarterly dividends.

Demand for Paper Rising in Midwest Area

Continued Increase In Orders For Kraft Paper Now Broadening Out To Include Other Lines As Outlook Improves—Paper Executive Discusses Market—Legislature To Consider Wages and Hours.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., January 6, 1941—With holiday interruptions about over and the inventory period rapidly nearing completion, local paper merchants are beginning to enjoy that increased activity which usually precedes "better times." The kraft market carried on its gains of the previous few weeks and the reflected consumer demand was reported to be now spreading out into other lines. Newspapers have reported an improved contracted advertising lineage which will help the newsprint market and this bulge upward has been matched by announcements of direct mail campaigns in 1941 designed to capture, what Roger Babson prophesies as a 10 per cent upturn in general business. Books and covers found evidence of these plans in an increase in inquiries and, in many cases, in some substantial orders. Bonds and ledgers were just beginning to note a broadening out of demand while other markets reported a slightly more substantial basis to operations. This was reported as noticeable in the markets that were characterized as "shaky" a few weeks ago. Waste papers stood firm during the holiday week.

Paper Executive Reviews Market

The Chicago *Journal of Commerce* this week carries a most interesting interview given by Irving Osborne, Jr., president of the Cornell Wood Products Company of this city. Mr. Osborne points out that the paper industry is one of the largest in the country, "a growing business which, so far, has exhibited no indications that it is nearing its peak consumption." He adds that "in 1939 it recorded its biggest year in its history and the 1940 record will show an increase over that."

In discussing the effect of war on the market Mr. Osborne says: "The war and our subsequent enlarged domestic business activity has caused a substantial increase in the demand for paper and paperboard produced in this country and Canada. The inability of the European and Scandinavian countries to export pulp and finished paper has resulted in the world turning to the United States for its supply of wood pulp and finished paper. This has brought to the front a very interesting problem as far as wood pulp is concerned, as the United States never has been self-sufficient in supplying itself with this important raw material."

Production Has Increased Greatly

"Domestic production and importations from Canada have increased tremendously and now no serious shortage is expected although some mills may suffer from lack of certain special grades or types of pulp formerly imported from Europe." He points out that "it is because of a dormant capacity that serious shortages of wood pulp have not developed and that the paper industry as a whole will not seriously lack for this raw material."

"In making plans for the future the pulp industry must take into consideration the requirement of new industries as well as the export demand in other countries. It is difficult to predict how a sudden termination of the war might affect the situation. Should large quantities of the European pulp be placed on the market there would, undoubtedly, be temporary confusion. But many people believe that the European countries, particularly Norway, Sweden and Germany, have reached their limit of wood pulp production due to the limitation of their timberlands. Therefore, with the increasing world consumption of this important raw material, by both the growing paper industry and the many new users of wood pulp fibre, any confusion which might be precipitated at the end of the war should be of comparatively short duration if general business activity can be maintained at reasonable levels. It is believed that under these conditions a continuing demand will exist for the efficient pulp and paper producing facilities of the North American continent."

Custom Collections Decline

J. A. Ziemba, collector of customs at Chicago, this week reported that duties paid in the Chicago districts during the year of 1940 totaled $9,567,104 compared with $11,122,888 for 1939. December customs collections at Chicago totaled $1,044,616 in contrast with $1,143,894 for December, 1939.

Legislature to Discuss Wages and Hours

The Illinois Legislature convenes next week for its regular session which will extend on until July 1. During the session many measures will come up of major interest not only to paper concerns with mills and plants in the State but to companies with outlets in Illinois. Included among the proposals which will undoubtedly come up for discussion are a State wage-hour law, Baby Wagner Act, proposed changes in the rates under the Workmen's Compensation Act and possible amendment to the Illinois Unemployment Compensation Insurance statute. Some study will also be given to the Retailers Occupation Tax particularly in view of the many court decisions which have eliminated certain interests from the obligation of paying the taxes and thus narrowed the basis of the tax materially. Also up will be the proposition of removing the sales tax on foods, a move which might, if not covered by rigid economies, result in the threat of sending the sales tax to 4 per cent. It is also possible that efforts will be made to eliminate the "tax on the tax" feature which now requires the retailer to pay the 3 per cent to the State not only on the amount but on the added expense recovered from the consumer.

Lee Turley Visits Foods Show

One of the visitors to the Chicago convention of the National Frozen Foods Association was Lee Turley, advertising executive of the Nekoosa-Edwards Paper Company. His company manufactures a product known as "Nepco" which is used as a refrigerated locker paper.

Philadelphia Associations Hold Meetings

Waste Paper Merchants To Hold Annual Banquet On February 13 —Fine and Wrapping Paper Divisions of Paper Trade Association To Meet—Paper and Cordage Association Holds Special Meeting.

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., January 6, 1941—The Philadelphia Waste Paper Merchants Association will hold its annual banquet on Thursday, February 13, 1941, at the Benjamin Franklin Hotel, 9th & Chestnut streets, Philadelphia. The banquet committee consists of the following: John Beitchman, A. Beitchman & Sons, 236 Queen street, Morris Mossman, P. Mossman & Co., 417 North 4th street, George A. Di Ienno, 5617 Race street, A. L. Feirman, Lafayette Building and John Bailey, Penn Paper Stock Company, 1025 N. Front street. The annual meeting will be held in conjunction with the banquet on February 13, and the following members, which were nominated at the Association's meeting on December 5, will be presented for election: President, Arthur L. Feierman; vice-presidents, John Bailey and Morris Mossman; secretary, Dominic A. Di Santi, A. Di Santi & Son; treasurer, William L. Simmons, John L. Simmons & Sons.

Fine and Wrapping Paper Men To Meet

In consonance with the series of joint luncheon meetings of the fine and wrapping paper divisions of the Paper Trade Association of Philadelphia inaugurated by president Nate Saxe, and scheduled for the second Monday of each month, there will be held at the Downtown Club, Ledger Building, 6th & Chestnut streets on Monday next, January 13, at 12:30, a meeting of both these divisions simultaneously with the annual meeting of the Association, at which time election of officers for the ensuing year will take place. As required by the by-laws, the nominating committee at a stated meeting, selected the following nominees who will serve as directors: *Fine*—LeRoy S. Bishop, Ralph Luff, John P. Schmidt, Ed. Walter, George Weaver, Wilson Whiting. *Wrapping*—Frank Dubin, George Goldman, George K. Hooper, W. B. Killhour, Jr., Nathaniel Saxe and C. A. Wilder. Immediately after their election the foregoing directors meet and present the names of the president, vice-president, treasurer and secretary, who are immediately elected to their respective offices.

Paper and Cordage Men at Special Meeting

The newly elected officers of the Philadelphia Paper and Cordage Association met with the newly elected directors at a special meeting December 26 and outlined their plans for 1941. The new officers and Board of Governors with the committee chairmen are as follows: President, John J. Shinners, Jr., Acme Specialty Company; vice-president, Harry J. Smith, Thos. W. Price Co.; treasurer, Everett Hoffman, J. E. Fricke Co.; secretary, Richard Gifford, H. M. Gifford Co.; Board of Governors: George K. Hooper, J. R. Howarth, E. K. Lay, Jos. S. Miller, Arthur Sherrill, E. L. Richards and Fredk. I. Brower. Membership Committee—J. L. Howarth; Entertainment Committee — Wm. R. Peterson; News'n Nonsense—Fredk. I. Brower; Golf Committee—E. L. Richards.

Because of the record of performance established by immediate past president George K. Hooper, the incumbent officers of the Philadelphia Paper & Cordage Association are swinging into action with the idea in mind of maintaining these standards.

The next regular meeting will be held on Friday, January 17th, with lunch at the newly selected meeting place—The Downtown Club in the Ledger Building, 6th & Chestnut streets. The guest speaker will be George S. Derry, Sr., president of the Philadelphia Coca-Cola Bottling Company, who will talk on "Employer and Employee Relations."

Leonard T. Beale Comments on Progress

Leonard T. Beale, president, Pennsylvania Salt Manufacturing Company, in a symposium of opinions released to the press during the week by heads of industrial, commercial and utility corporations, has this to say in regard to the growth reflected in the United States.

"For many years whenever we Americans have taken part in the councils of nations we have been reminded by our elders that we are but a young—a very young—people. Europe has taunted us with our lack of culture and refinement and Asia has placidly tolerated our callow youthfulness, and not until the last war demonstrated our tremendous growth and latent power, were we taken seriously.

"Today we are in an important and rather painful period of transition. Today we find that we are now the oldest constitutional democracy on the earth. Today we find that we have absorbed much of the culture of Europe and some of the aged wisdom of the East and have integrated them with the vigorous young strength drawn from the virgin soil of the New World.

"I have been reminded of these things as I have studied figures just compiled showing the tremendous growth of our chemical industry since 1849. From a bare five million dollars the chemical industry of this country has grown to a dollar volume of nearly a billion and quarter.

"Yet it seems to stand today merely on the threshold of a thousand doors through which it will pass to serve humanity tomorrow.

"The measure of the chemical industry's growth is, I think, pretty much the measure of the growth of our country, and tomorrow the measure of its strength may be the measure of our country's strength—strength for defense against aggression, power for progress, and moral and mental preparation to wear the mantle of work leadership which seems to me the inevitable lot of our powerful young-old Nation.

"We have grown up. Europe and Asia look to us more and more for the leadership which we shall be forced to assume because our enormous power and our unlimited resources place the responsibility on our shoulders whether we like it or not. Are we to be the last to realize that we have grown up?"

Says Bill Would Not Reduce Duty

NEW YORK, January 4, 1941

EDITOR PAPER TRADE JOURNAL:

On page 15 of your issue of December 19 under the heading, "Would Reduce Duties on Paper," you have an article purporting to explain the bill introduced by Congressman Cullen.

The whole article, and particularly the heading, is most misleading. The purpose of the bill is not to reduce duties on British goods, as stated by you, but to prevent duties on British goods being increased. If the bill becomes law prices on British goods would not be reduced, but if some such law is not enacted prices will have to be increased. It is hardly fair to describe the measure as a means of giving aid to Britain by facilitating the sales of their products when, in fact, it is merely to avoid hindering the sale of British goods.

You state in your article that under long standing law and precedent ad valorem duties are calculated on the foreign market price. This is not correct. Section 402 of the Tariff Act specifically states that ad valorem duties shall be calculated on the foreign value, i. e., the home market value, or the export value, i. e. the price paid by the American purchaser, whichever is higher.

In most cases, the foreign value and the export value are the same. Now, to discourage consumption by the British public in order to conserve production for war purposes, the British Government has imposed a purchase tax of 33 1-3% on certain goods sold in the home market, but this tax does not apply to export sales. As the law now stands, although there is no increase in the real price of the goods, the value for duty will arbitrarily be increased 33 1-3% because of a tax imposed in Great Britain purely as a restrictive measure, although at the time the Tariff Act was enacted the possibility of any such restrictive tax was never contemplated. The duties now in effect were those deemed by Congress adequate for the protection of American industry and their adequacy in this respect as far as the Paper Trade is concerned, is demonstrated by the very meager imports of dutiable papers, and those mainly specialties.

To refer to pulpboard and ground wood printing from Canada is to confuse the issue. The ad valorem duty on both these items is 5%, hence the inclusion or removal of an 8% sales tax would affect the amount of duty by 5% of 8%, i. e. four-tenths of one per cent!

You state that practically every grade of paper imported from Great Britain would be affected by the bill. That is not correct. No article is subject to the tax unless it is scheduled under the (British) Act and it so happens that none of the papers imported by us are so scheduled.

There is another aspect of the problem that you have overlooked. At the present time and under existing war conditions, the Treasury Department is not in a position to make the investigations required to determine whether a particular article, when sold for home consumption in Great Britain, is subject to the Purchase Tax; hence whether the value for duty is or is not increased by the tax. This is a subject too involved for discussion here, but it is the consensus of all informed interested parties that unless steps are taken to clarify the situation, endless confusion is to be expected with all importations from Great Britain, even of articles not affected by the tax.

Very truly yours,

E. CHILD, President,

H. Reeve Angel & Co., Inc.

The article referred to in the foregoing letter was prepared by the Import Committee of the American Paper Industry.—Editor, Paper Trade Journal.

Indianapolis Inventories Heavier

[FROM OUR REGULAR CORRESPONDENT]

INDIANAPOLIS, IND., January 4, 1941 — With Christmas out of the way, the local paper jobbers are getting ready for the new year and inventory. From all reports, inventories will be heavier this year than they were last and average prices are somewhat stronger than they were a year ago. It is certain business in most lines is of larger volume.

The bright spot of the entire year was the enormous demand for building and roofing papers. The demand continues, though it has abated some in the last month. Thus far weather has not been severe enough to halt outside construction, though not as much building is being started. Old contracts are being completed. Dealers have rather small stocks on hand, but most of them are well balanced and will not be permitted to go lower. Indications for the new year are very bright in the construction field.

Demand for fine papers is average. There has been a slight leveling off during the last month, but the outlook for 1941 is rosy. Books, covers and ledgers are moving in fair volume and reports from local printers show a fair amount of work in prospect for the new year.

Kraft is in good demand. Paper bags and wrapping paper sold well during the holiday season, but a slight decline is expected after the first of the year. This is seasonal and does not worry the trade. Prices are steady. Tissues are moving nicely with no price changes.

Paper board production in Indiana mills has declined somewhat during the month, but inventories at the various factories are rather high, though not out of line when the general economic situation is considered. Local box factories are working average for this time of the year and are preparing for inventory.

Newsprint is moving well and advertising lineage for the holidays was slightly higher than a year ago.

Moderate activity is seen in the paper stock market and prices show no change. Some decline in rag demand is reported.

Canadian Newsprint Exports Up

TORONTO, Ont., Jan. 6, 1941—During the last year the Canadian government has been extending its efforts to increase trade with the Latin Americas. Whether or not it is a direct result of these efforts, or some other cause, figures released by the Newsprint Association of Canada and compiled from reports to the Dominion Bureau of Statistics, show that Canada shipped to Latin American countries during eleven months of 1940, nearly 32 per cent more newsprint than in 1939. The figures are: 1939, 30,562 short tons; 1940, 163,764 short tons. The increase during the same period in shipments to all countries was approximately 24 per cent.

Unique Marketing of Oil

Some people call it specialized marketing but the Alliance Oil Corporation, claims that all it is doing is selling "the right oil to the right customer."

This concern started in business to handle the many and varied by-products of petroleum. Starting with the products of a few Pennsylvania refiners, it has expanded its scope and now deals with refiners in all parts of the country.

What distinguishes Alliance is the fact that its members are oil marketers and specialists rather than brokers, or jobbers. Primarily, this means that Alliance acts as principals in every sale of oil it makes,

LEONARD C. QUACKENBUSH

and assumes all risks for quality and finance. According to Leonard C. Quackenbush, president of Alliance, this gives the company many advantages.

"Our business is based on selling the right oil to the right customer," explained Mr. Quackenbush. "We can do this because we act as principals and also because we sell by specification and specification only. If a refiner turns out a certain grade of oil we find a market for it. If we can't, we suggest manufacturing changes so that it is marketable. Similarly, if a manufacturer needs a certain oil to do a certain job, Alliance will produce that oil, practically tailor-made to whatever the requirements are."

Alliance's method of marketing is sound. For the buyer, it means a consistent and uniform quality of oil, controlled by Alliance whether it comes from one oil company or a dozen. This combined with Alliance's specialized knowledge of oils, has brought Alliance recognition from foreign governments and from such varied industrial fields as aviation, paper manufacture, drugs, cosmetics, baking, plastics and chemistry.

Puget Sound Nets $2.28

The Puget Sound Pulp and Timber Company for the eleven months ended November 30 reports a net income of $1,001,849 after taxes and charges, equal after preferred dividends to $2.28 a share on 326,212 common shares, compared with $55,969, equal to 45 cents a share on 123,637 shares of 6 per cent preferred stock in the corresponding period of 1939.

Northern New York Paper Mills Busy

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., January 6, 1941—Paper manufacturers in this section assert that the outlook for 1941 is bright and indications are that production will continue at top speed. They base their assertions on facts and upon the performance of industry and capital in the six months now ending. Activity has been increasing during the past several months with no signs of a tendency to decrease.

An official of the Taggart Corp. and the St. Regis Paper Co., stated that both concerns have large orders on hand which will carry well into next year. He said that earnings of most concerns in the pulp and paper industry for 1940 will show marked improvement generally over the results for 1939.

The owner of the Bagley & Sewall Company stated that his concern has a contract for a 130-inch Fourdrinier paper machine and a great many job orders. The prospects for new orders are also considered good. An official of the Dexter Sulphite Pulp and Paper Company said that everything looks quite favorable while the concern has a number of unfilled orders. Business is now good at both the pulp and paper mills. The Brownville Board Company, manufacturers of box and manila boards, stated that a large volume of defense business is in prospect and the regular business looks good. An official of the Stebbins Engineering and Manufacturing Company, constructing engineers of acid resisting linings and tanks for all processed industries, said that they are loaded to the gills with business and the volume in 1941 will be much greater than in the preceding year. At Knowlton Brothers, Inc., it was stated that the concern for the past several months has been operating on a twenty-four hourly basis.

Government Paper Bids

WASHINGTON, D. C., Jan. 8, 1941—Government Printing Office has received the following bids for 3,275 pounds (25,000 sheets) of 32 x 43 India tint supercalendered book paper; Whitaker Paper Company, 6.15 cents; and Mudge Paper Company, 6.02 cents.

For 8,057 pounds of 48 x 73½ white supercalendered book paper; Barton, Duer & Koch Paper Company, 6.32 cents; Stanford Paper Company, 5.95 cents; Whitaker Paper Company, 5.45 cents; Mudge Paper Company, 5.19 cents; and Paper Corporation of U. S., 5.84 cents.

For 27,060 pounds of white supercalendered book paper in 56¼ rolls; Barton, Duer & Koch Paper Company, 5.92 cents; Stanford Paper Company, 5.60 cents; Whitaker Paper Company, 5.45 cents; Mudge Paper Company, 4.762 cents; and Paper Corporation of U. S., 5.47 cents.

For 10,700 pounds of 37½ x 60 same; Barton, Duer & Koch Paper Company, 6.32 cents; Stanford Paper Company, 5.95 cents; Whitaker Paper Company, 5.45 cents; Mudge Paper Company, 5.19 cents; and Paper Corporation of U. S., 5.84 cents.

For 10,240 pounds of 34 x 44 green and buff sulphite writing paper; Barton, Duer & Koch Paper Company, 7.48 cents; Mudge Paper Company, 7 cents; and Mathers-Lamm Paper Company, 7 cents.

For 6,111 pounds of 75 per cent rag, 45 x 63 white map paper; Mudge Paper Company, 13.06 cents; and Paper Corporation of U. S., 15.2 cents.

Converted Papers Off in 1939

Manufacturers of converted paper products (not elsewhere classified) reported slight decreases in employment, wages, and production for 1939 as compared with 1937, according to figures compiled from returns of the Census of Manufactures for 1939 and released on December 23 by director William Lane Austin, Bureau of the Census, Department of Commerce.

This industry, as constituted for census purposes, embraces establishments primarily engaged in the manufacture, from purchased paper stock, of crepe paper, cups, dishes, etc., egg-case fillers, paper napkins and towels, papeteries, playing cards, paper patterns, tags, seals, soda straws, tablets, toilet paper, facial tissue, etc.

The wage earners primarily engaged in manufacturing in this industry in 1939 were 21,775, a decrease of 4.9 per cent compared with 22,898 reported for 1937, and their wages, $22,184,555, were less than the 1937 figure, $23,479,483, by 5.5 per cent. These decreases may be partially accounted for by the fact that the 1939 Census of Manufactures questionnaire, for the first time, called for personnel employed in distribution, construction, etc., activities separately from the manufacturing employees of the plants. It is not known how many of the wage earners reported for 1937 were engaged in distribution and construction and how many were engaged in manufacturing. Employees of the plants reported as engaged in distribution and construction activities in 1939 are not included in this preliminary report but will be included in the final report.

The value of products for this industry for 1939 amounted to $161,305,558, a decrease of 3.2 per cent compared with $166,587,043 reported for 1937.

Summary statistics for the industry for 1939 and 1937 are given below. All figures for 1939 are preliminary and subject to revision. Detailed production statistics will be presented in a later report.

SUMMARY FOR THE INDUSTRY: 1939 AND 1937

(Because they account for a negligible portion of the national output, plants with annual production valued at less than $5,000 have been excluded since 1919)

	1939	1937	Percent of increase or decrease (—)
Number of establishments	384	378	1.6
Salaries personnel [1]	3,330	3,947	—15.6
Salaries [1, 2]	$8,713,637	$8,887,108	— 2.0
Wage earners (average for the year) [3]	21,775	22,898	4.9
Wages [2, 3]	$22,184,555	$23,479,483	— 5.5
Cost of materials, supplies, fuel, purchased electric energy, and contract work [2]	$83,375,081	$87,564,276	— 4.8
Value of products [2]	$161,305,558	$166,587,043	— 3.2
Value added by manufacture [4]	$77,930,477	$79,022,767	— 1.4

[1] No data for employees of central administrative offices are included.
[2] Profits or losses cannot be calculated from the census figures because no data are collected for certain expense items, such as interest, rent, depreciation, taxes, insurance, and advertising.
[3] The item for wage earners is an average of the numbers reported for the several months of the year and includes both full-time and part-time workers. The quotient obtained by dividing the amount of wages by the average number of wage earners should not, therefore, be accepted as representing the average wage received by full-time wage earners.
[4] Value of products less cost of materials, supplies, fuel, purchased electric energy, and contract work.

Nuptials in Paper Industry

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., January 6, 1941—One of the fashionable weddings of the holiday season took place at the First Presbyterian Church at Neenah, Wis., Thursday evening, January 2, when Miss Priscilla Gilbert, daughter of Mr. and Mrs. A .C. Gilbert, became the bride of Thomas C. Catlin of Appleton, Wis. Mr. Gilbert is president of the Gilbert Paper Company, Menasha, Wis. The ceremony was performed by the Rev. Walter R. Courtenay. A reception was held afterwards at the North Shore Country Club. Mr. and Mrs. Catlin left on a honeymoon trip to an "unknown destination" and upon their return will reside in a new home at 229 Stevens St., Neenah. Mr. Catlin is a graduate of the University of Wisconsin, and is associated with the Menasha Products division of the Marathon Paper Mills Company at Menasha.

Leslie L. Larson and Miss Lucille Mais, both of Appleton, Wis., were married December 20 at Salt Lake City, Utah, and after a honeymoon trip to the west coast will reside at 425 W. Wisconsin Ave., Appleton. Mr. Larson was graduated from the Institute of Paper Chemistry, Appleton, last June and is employed by the Kimberly-Clark Corporation, Neenah, Wis. His bride formerly was a file clerk at the Institute.

Clarence J. Weiss, who is associated with the Champaign Paper Company, Houston, Texas, and Miss Ella Brelje of Appleton, Wis., were married at Mt. Olive Lutheran Church at Appleton New Year's day by the Rev. R. E. Ziesemer. They will be at home at Houston after January 15.

Newsprint Outlook Good

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., January 4, 1941—In a statement regarding the outlook for the newsprint industry in 1941, Charles Vining, president of the Newsprint Association of Canada, says:

"Canadian newsprint shipments in 1940 amounted to approximately 3,425,000 tons against an effective capacity of 4,368,000 tons. Operations in 1940 were thus approximately 78 per cent of capacity. This represented a substantial improvement over the 1939 total of 2,861,000 tons and the 1935-1939 average of 3,003,000 tons.

"The 1940 increase was due to abnormal wartime conditions which virtually eliminated some 700,000 tons of competitive export shipments from Scandinavia and Germany. Assuming continuance of this abnormal situation, it is estimated that Canadian shipments in 1941 will remain at an unusually high level but will show a reduction of about 200,000 tons compared with 1940.

"The estimated 1941 reduction is due to shipping, exchange and rationing difficulties in overseas markets. On the basis of this estimate, the mills in Quebec and Ontario under governmental prorating will operate at 67 to 70 per cent of effective capacity. The Canadian mills as a whole in 1941 are likely to have something over a million tons of unused available capacity."

Establish New Office in London

Bowmall & Co., Inc., 250 Park avenue, New York, have just received the following cable from their London connection, the Anglo American Pulp and Paper Company, which explains itself:—"Office destroyed through enemy action. New address Sentinel House 46 Southampton Row WC1. All cables address to Bachrach or Hartig Ofiservis London. Inform all connections."

Improved!

BELOIT HORIZONTAL *Dual Press*

PATENTS PENDING

• The Beloit Horizontal Dual Press has been improved by incorporating a primary roll over the first suction press, adding another nip. Thus, this press is now equivalent to three presses instead of two, the first suction roll doing double duty.

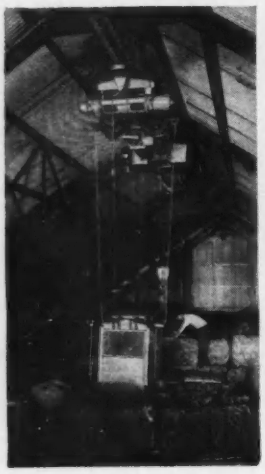
• The success of the Beloit Horizontal Dual Press has been definitely established. This new press gives even better results.

THE BELOIT WAY BELOIT IRON WORKS PAPER MACH'Y BELOIT WIS. **IS THE MODERN WAY**

BELOIT IRON WORKS BELOIT WISCONSIN

New Type Tramrail Carrier

The Cleveland Tramrail Division of the Cleveland Crane and Engineering Company, Wickliffe, Ohio, has developed a new type of tramrail carrier with raise-lower cab. This equipment is available in two general forms. One form provides for the raising and lowering of cab and load together. The other provides for the cab and load raising and lowering independently of each other. Which type to use is contingent upon the service and materials to be handled. With a raise-lower cab unit one operator may take care of all operations involved in moving materials with an electric cab - controlled overhead tramrail system: attaching load to crane hook, detaching, and operation of the tramrail unit. If the materials are of such nature that a lifting fork need be employed, one operator can also handle the entire job just as with a crane hook.



The unit shown has a vertical travel of 40 feet for both cab and hook. Equipment can be furnished for operation from much greater heights if desirable. The load hoist, the cab hoist and the carrier are all motorized and controlled from the cab. This particular unit is so arranged that it cannot be traveled until the cab is in the high position.

Tramrail units having cab connected to lifting fork or other similar material handling devices, are generally arranged so that they may be traveled even when cab is suspended at a considerable distance below the carrier. This enables the operator to steer his lifting fork into or away from the load on the floor or on top of a high pile with precision and as the situation demands.

A salient advantage of Cleveland tramrail raise-lower cab carriers is their great aid to safety. With their use, piling height is not limited and the operator is just as safe 60 feet above the floor as 10 feet. The danger of heavy kegs and other materials falling on him from above is eliminated. The highest tier of the pile can be piled just as level and securely as the tier resting on the floor.

Cleveland Tramrail raise-lower cab carriers are especially suitable for the economical handling of kegs, drums, rolls of paper and cloth, lumber, sheet steel, cement, cereals and a great many other products. They are available for operation at various heights and speeds as required.

Stevens & Thompson Hold Sales Meeting

GLENS FALLS, N. Y., January 6, 1941—The annual sales convention of the Stevens & Thompson Paper Company of Greenwich, was held in this city last week with about 25 members of the sales staff in attendance. Sessions continued daily for several days. The gathering was presided over by J. W. Bright, president of the company, and R. B. Stevens, sales manager.

Papermaking Program for TAPPI Annual

Albert E. Bachmann of the Missisquoi Corporation and Chairman of the TAPPI Forming and Finishing Committee has announced the following program for the annual meeting of the Technical Association of the Pulp and Paper Industry to be held at the Roosevelt Hotel, February 17-20, 1941.

"The Calendering of Paper: I. Effect of Pressure on Sheet Properties" by G. E. Mackin, E. L. Kelly and P. K. Baird, Forest Products Laboratory. "The Moisture Control of Cylinder Papers" by R. T. Mann, Foster Paper Company.

"A Contribution to the Knowledge of the Mechanics of Softening Paper" by A. H. Nadelmann, Glassine Paper Company.

"The Use of Urea-Formaldehyde Resins for High Wet Strength Paper Production" by Philip B. Taft, The Resinous Products and Chemicals Company.

"Continuous Coloring of Paper and Board" by F. A. Soderberg, General Dyestuffs Company.

"Copes Consistency Control" by Don Allhouse, Northern Equipment Company.

"Enzyme Conversion" by Alexander Frieden, Stein, Hall Manufacturing Company.

"Tissue Formation Operating Problems" by H. G. Specht, Eastwood-Nealley Corporation.

"Water Characteristics of the Wet End of the Paper Machine" by P. M. Loddengaard, Bulkley, Dunton Pulp Company.

"Design and Performance of Supercalender Winders" by W. M. Stocker, Cameron Machine Company.

"The Performance of the Stream-Flow Vat System on Nine Point" by J. R. Buchanan, The Harriman Company.

"Stabelite Resin—A Hydrogenated Rosin for Sizing" by J. H. Long and A. C. Dreshfield, Hercules Powder Company.

Newfoundland Mills at Capacity

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Jan. 8, 1941—Both the pulp and paper mills at Newfoundland have been operating at capacity since the beginning of the year, according to a report from the American Vice Consul, St. John's. The production of newsprint at Corner Brook for the first six months of 1940 set an all-time record. The mills are now running six and one-third days per week and indications are that they will continue to do so for the remainder of the year. Both companies propose to greatly increase their cut of pulpwood for the season. The increase will be about 115,000 cords, and the total cut will be 681,000 cords, as against 566,500 for last season.

Joint Meeting Dates

The Kalamazoo Valley Division of the Technical Association of the Pulp and Paper Industry will meet with the Michigan Division of the American Pulp and Paper Mill Superintendents Association at Kalamazoo, Mich., Thursday, January 23 in place of January 21 as previously stated.

The Ohio Section of the Technical Association of the Pulp and Paper Industry will meet with the Miami Valley Division of the American Pulp and Paper Mill Superintendents Association, Saturday, January 25 in place of the 23 as previously stated.

The Direct Way

AN ALL-ELECTRIC ADJUSTABLE-SPEED DRIVE FOR A-C CIRCUITS

Speed Ranges up to 16 to 1 — Sizes 1 to 30 hp.

RELIANCE V★S DRIVE

THE V★S way shortens the distance from power to work. It's the direct way, eliminating intermediate speed-changing devices, clutches, gear trains, a multiplicity of handles and knobs. It makes full use of the electric motor as a simple speed-changing device as well as a power unit (1).

From one handle in a convenient spot speeds are changed smoothly over ranges up to 16 to 1 while the machine is running. To stop, press a button; to start again, press another and the machine comes back to its previous speed (2).

And here are more features that help step up production: quick stopping, reversing, safe speeds for threading and inching, ample starting torque with smooth acceleration.

Using a proven principle of speed control, the Reliance V★S Drive now gives you these many advantages at a new low price. This is possible because of the packaged speed control unit (3) which is connected by three wires to a 3-phase a-c. power circuit. It takes little space and can be mounted anywhere.

RELIANCE ELECTRIC & ENGINEERING COMPANY

1088 Ivanhoe Road • • • Cleveland, Ohio

BIRMINGHAM • BOSTON • BUFFALO • CHICAGO • CINCINNATI • DETROIT • GREENVILLE (S. C.)
HOUSTON (TEX.) • LOS ANGELES • NEW YORK • PHILADELPHIA • PITTSBURGH • PORTLAND (ORE.)
ST. LOUIS • SAN FRANCISCO • SYRACUSE (N. Y.) • AND OTHER PRINCIPAL CITIES.

CONVENIENCE, WITHOUT LIMITATIONS

The start-stop button and speed changer can be placed anywhere that you can run a wire. Grouped with other control elements for the machine they make centralized control complete.

Get Bulletin 309 for details.

RELIANCE A-C D-C MOTORS

Ohio Paper and Cordage Men Meet

The Cincinnati Cordage and Paper Company of Cincinnati, Dayton, and Knoxville held their annual Sales Conference at the Dayton Biltmore Hotel Friday, December 27, 1940.

The Salesmen and Officers of the Company, numbering 45 men, sat down together in conference all day and evening. They were addressed by several of the leading paper and twine manufacturers of the country, following which round table discussions were held.

Jay C. Forse of the Cleveland Mill and Power Company gave a talk on cotton twines and their applications to different lines of business.

Paul Herrlinger, vice-president of the Gummed Products Company, Troy, Ohio, gave an excellent demonstration on gummed tape. These talks covered the entire morning session, which was presided over by E. F. Evans, secretary.

After lunch Albert Smith, vice-president of the American Envelope Company, West Carrolton, Ohio, gave a demonstration and talk on envelopes. He was followed by Ronald Drake, sales promotion manager of the Champion Paper and Fibre Company of Hamilton, Ohio, who spoke on coated papers. The International Paper Company's representative, J. W. Vermont, went over their line very carefully so as to give us information that would be helpful to the salesmen. All the speakers brought to the meeting a fine educational program and the entire 45 men felt that they had received a day of inspiration and education. R. G. Evans, treasurer, presided over the Fine Paper meeting bringing it to a close with an analysis of the changes and improvements made in the business during the year.

After dinner the meeting was addressed by John F. Church vice-president who served as toastmaster. A. T. Nesbitt, president, gave an inspirational talk to the salesmen and what we might expect in the coming months. Awards for outstanding individual achievement on the part of a number of the salesmen were presented by Don A. Nesbitt, vice-president. Paul Brennan, sales manager of commercial Sales, Frigidaire Division, General Motors Corporation addressed the meeting on "Business in the Near Future." He gave a very interesting and instructive picture as he sees the immediate future of business.

Neenah Honors Employees

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., January 4, 1941—Gold watches were presented to three veteran employees of the Neenah Paper Company, Neenah, Wis., during the annual Christmas turkey dinner December 23 at Valley Inn. More than 300 were in attendance at the party.

Recipients of the watches were Herman Loehning, continuously with the firm for 49 years, Ott Loehning, 48 years, and Herman Asmus, 43 years. The presentations were made by D. K. Brown, president. It was pointed out that 85 of the employees have been with the company for more than twenty years.

Kimberly Stuart, first vice-president, was toastmaster. Talks were given also by Melvin Redlin, chairman of the dinner, and Leo Schubart, who announced the safety program for 1941. George Seitz, president of the mill credit union, was presented with a gift in appreciation of his services.

Crystal Tissue Gives Extra Compensation

MIDDLETOWN, Ohio, January 6, 1941—It has been the custom of the Crystal Tissue Company and the Crystal Waxing Company to hold an annual Christmas party just prior to the holiday. This year it was held during the evening of December 20 and was in charge of the secretary and treasurer of the company, Miss Elizabeth Cahill. There was the usual program that goes with a Christmas party and of course Santa Claus was present. The party was held in the company office auditorium which was filled to capacity.

E. E. Grant, president of the Crystal Tissue Company, gave a short talk with reference to business conditions and welcomed the group to the party.

On the day of this annual party the company usually makes a distribution of extra compensation checks and of course this added to the spirit of the occasion. The extra compensation this year averaged three to three and one half weeks' salary per employee.

Storrs & Bement Hold Christmas Party

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., January 4, 1941—There was a highly enjoyable Christmas party at the offices of Storrs & Bement Company December 24, with the entire staff, numbering about 80, as guests. The program started about 10:30 o'clock, with addresses by William N. Stetson, Jr., president, and William H. Brewer, vice-president and general manager. Other executives present included Paul Jones, secretary, and Raymond B. Nichols, assistant treasurer. William L. Wilson, of the staff, was chairman of the committee of arrangements.

A feature of the event was a beautifully illuminated Christmas tree from which at 11 o'clock, each one was presented with a gift that helped substantially to bring about a far better holiday from a monetary standpoint.

A buffet luncheon was served at 12.30, followed by dancing to the music of a marimba band, which continued until about 3 o'clock.

Canadian Newsprint Price Unchanged

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., January 4, 1941 — Leading newsprint manufacturers here have advised their customers that the present price of newsprint will continue unchanged for the second quarter of 1941. There has been no increase in the price of newsprint since January 1938, though in the meantime there have been substantial increases in the cost of material and labor, and also in taxes. In announcing their decision to customers, manufacturers say, "We believe that notwithstanding increased costs this policy of maintaining a moderate price of newsprint paper will be to our mutual advantage."

H. S. Dennison Made Deputy Chairman

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., January 6, 1941—The Board of Governors of the Federal Reserve System have chosen Henry S. Dennison president of the Dennison Manufacturing Company of Framingham Mass. as deputy chairman of the Federal Reserve Bank of Boston for the year 1941.

ALLOY-LINED TANKS *for Acid Storage*

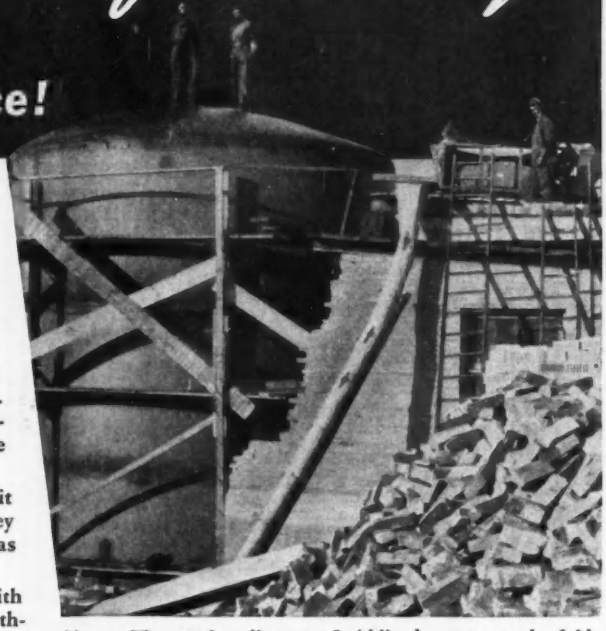
PRETESTED, Then Proved in Service!

YOU need no longer be dubious about using alloy-lined tanks where corrosive conditions are severe. For A. O. Smith has developed a testing procedure by which we ascertain in advance how an alloy will perform as a vessel lining. With this procedure given your full co-operation, it is possible to select the alloy which will prove most satisfactory under your particular service conditions.

A case in point is the experience of a prominent Wisconsin paper mill with a 20-foot-diameter Smithlined tank. The success of the Smith testing method was here field-proved under the severe conditions of acid storage in the service of this well-known paper company.

Smithlined vessels reduce maintenance costs, permit higher temperatures and pressures to conserve heat; they also eliminate leakage with its resultant acid and gas nuisances. Size requirements are no obstacle.

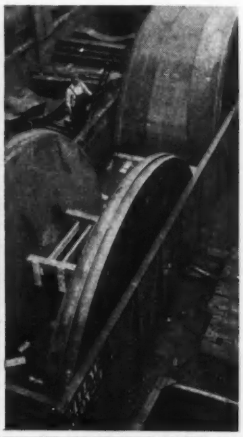
When you have a vessel corrosion problem—consult with Smith, and benefit from the broad background of Smith-lining experience. A. O. Smith Corporation, Milwaukee, Wisconsin. Offices at New York, Pittsburgh, Chicago, Tulsa, Dallas, Shreveport, Houston, Corpus Christi, Los Angeles.



Above: The 20-foot-diameter Smithlined storage tank, field erected at a large Wisconsin paper mill. This tank is used for storing raw sulphite liquor of high concentration at elevated temperatures and pressure.

• • •

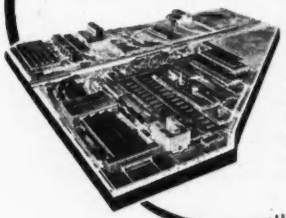
Below: Knocked-down sections of this tank ready for shipment. Note the spot-welded alloy lining on inside of sections.



DID YOU KNOW?

- A. O. Smith Corporation, founded in 1874, now operates a plant that covers 125 acres and employs over 5,000 men.
- A. O. Smith is the largest U. S. consumer of hot rolled steel, and the largest shipper on the Milwaukee Road.
- A. O. Smith is a leading manufacturer of many vital steel products, among which are:

Automobile Chassis Frames
Pressure Vessels for Every Purpose
Single-piece Glass-lined Tanks
Oil Field Tubular Goods
Welding Electrodes and Equipment



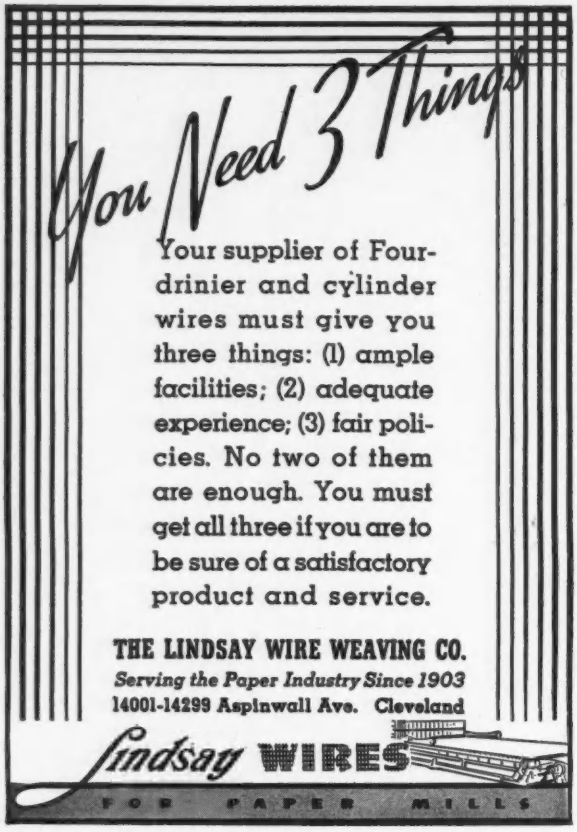
A.O.SMITH CORPORATION

Milwaukee, Wisconsin

PIONEER MANUFACTURERS OF ELECTRIC-WELDED

Pressure Vessels

Casing · Line Pipe


You Need 3 Things
Your supplier of Fourdrinier and cylinder wires must give you three things: (1) ample facilities; (2) adequate experience; (3) fair policies. No two of them are enough. You must get all three if you are to be sure of a satisfactory product and service.
THE LINDSAY WIRE WEAVING CO.
Serving the Paper Industry Since 1903
14001-14299 Aspinwall Ave. Cleveland
Lindsay WIRES
FOR PAPER MILLS

GAYLORD TO SPEND $6,000,000

(Continued from page 9)

at the conclusion of the program, which should near completion toward the end of 1941.

Corporation Organized in 1937

Gaylord Container Corporation was formed on June 16, 1937, by the merger of Robert Gaylord, Inc. of St. Louis, Missouri, and Bogalusa Paper Company of Bogalusa, Louisiana. At the Mill Division in Bogalusa are presently manufactured wrapping papers, bag papers and unbleached specialties for sale direct to the trade, while other products of the mill, container liners, chip board and nine point corrugating board are converted into corrugated and solid fibre boxes in the company's plants located in St. Louis, Bogalusa, Dallas, Houston, Atlanta, Tampa, Jersey City, Milwaukee, Greenville, S. C., and Weslaco, Texas. A new box plant is under construction in Oakland, California. Folding cartons, paraffined butter and ice cream cartons and other specialties are manufactured in a separate plant in St. Louis. Grocery bags, sacks, shopping bags and dry cleaner bags, as well as corrugated and solid fibre shipping containers, are made in Bogalusa. Sales offices are maintained in most large cities of the United States.

Present Officers of the Corporation

Officers of the corporation are, Col. A. C. Goodyear of New York, chairman of the board; Col. C. W. Gaylord of St. Louis, president; C. W. Goodyear of Buffalo, 1st vice-president; Vertrees Young of Bogalusa, executive vice-president; J. M. Arndt, vice-president directing sales; E. J. Spiegel, vice-president and treasurer; Conrad Hailparn, general purchasing agent, all of St. Louis; J. M. Gieger of New York, secretary, and L. C. Odell of St. Louis, assistant secretary.

The bag and box plants in Bogalusa are under the direction of Ivan A. Magnitzky, resident manager, and Gus Bienvenu, superintendent.

In the mill division, at Bogalusa, Alfred Suter is general superintendent; A. D. Levert, assistant superintendent; N. H. Seirsdale, works manager; C. W. Goodyear, Jr., assistant works manager; W. F. Gillespie, technical director; W. S. Richardson and Cooper Ratliff, assistants; B. B. Pierce, chief engineer; E. L. Cowan, assistant chief engineer; H. J. Foil, mill purchasing agent; A. G. Curtis in charge of pulp wood procurement; J. M. Murray, superintendent of pulp and paper mills; D. Wadsworth, assistant; Fred Augustine, superintendent of board mill; E. Bache, assistant; P. M. Garrison, chief forester; C. H. Allen in charge of real estate and taxes, and E. A. Holcombe, chief accountant.

The expansion program now under way was largely financed during the past summer by loans arranged by the Bankers Trust Company of New York, The First National Bank in Illinois, Mercantile-Commerce Bank and Trust Company of St. Louis, The Boatmen's National Bank of St. Louis, and The Marine Trust Company of Buffalo.

Clean Up Mill After Fire at Carthage

[FROM OUR REGULAR CORRESPONDENT]

CARTHAGE, N. Y., January 3, 1941—Officials of the Carthage Papermakers, Inc., stated last week that it will require several weeks to clean up and place the mill in operation again following the recent fire. It was stated that it will be a tedious job to remove the debris and this must be done before it can be determined the amount of material destroyed. Electrical equipment was also damaged. The mill building itself was not damaged by the fire, the blaze being confined to several hundred tons of waste paper. The paper, wet and smouldering, has been hauled from the pit during the past week. Officials claim that smoke and water damage will be extensive. The electrical panel board, equipment and apparatus of the turbine room were drenched with water with considerable damage resulting.

Reprinting of Simplified Practice

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., Jan. 8, 1941—Division of Simplified Practice, Bureau of Standards, has announced a reprinting and reissuance of Simplified Practice Recommendation R44-36, Box Board Thicknesses.

This recommendation is of direct interest to the manufacturers and users of paper boxes, because of the information it contains relative to thicknesses of various kinds of paperboard. Also shown are definitions, and the method of determining the weights of odd-sized sheets of this material.

This simplification program was promulgated, initially, on October 1, 1925. The 1936 revision was based on the existing standards of the National Paperboard Association, and was reaffirmed in 1940 prior to re-publication.

CONSTRUCTION NEWS

Everett, Wash.—The Soundview Pulp Company, manufacturer of sulphite fiber, has completed plans for addition to power house at mill on Federal avenue, for expansion in boiler department. It is estimated to cost over $50,000 with boiler unit and auxiliary equipment. A building permit has been issued and work will be placed under way at once.

Combined Locks, Wis.—Fire recently damaged a portion of mill of the Combined Locks Paper Company, manufacturer of book, writing and kindred paper stocks. An official estimate of loss has not been announced. The damage will be replaced.

Meridian, Miss.—The Flintkote Company, 50 West Fiftieth street, New York, N. Y., manufacturer of roll roofing products, insulating board, wall board, etc., has placed initial units of new branch mill at Meridian in operation and will step up production to full capacity at early date. Plant has been in course of erection for a number of months past and will be given over exclusively to the manufacture of wood fiber products, including structural insulation board, wall board, decorative board specialties and allied products. The mill will have a rated output of about 65,000,000 square feet of finished material per annum when entirely completed and is said to represent an investment of about $2,000,000. As previously reported in these columns, further expansion of this plant is now under way, with installation of additional equipment to form a major part of the program. Contract for building extensions is being carried out by the Rust Engineering Company, Clark Building, Pittsburgh, Pa., and Martin Building, Birmingham, Ala., which had the award for the original mill. This later development is reported to cost close to $1,000,000, in addition to amount noted, with completion scheduled in 1941.

Chicago, Ill.—The Rockwell-Barnes Company, 1511 West 38th street, commercial paper products, has awarded general contract to F. Markiewicz, 5000 George street, for new two-story addition to storage and distributing building, about 70 x 86 feet, reported to cost close to $25,000, with equipment. A permit has been issued and work will proceed at once. Charles E. Henderson, 134 North LaSalle street, Chicago, is architect.

Rhinelander, Wis. — The Rhinelander Paper Company, manufacturer of glassine, greaseproof and other paper stocks, has work nearing completion on addition to power house, 27 x 64 feet, to provide for expansion in boiler department, and unit is scheduled to be ready for service at early date. Erection is being carried out by C. R. Meyer & Sons Company, 50 State street, Oshkosh, Wis. No official estimate of cost has been announced. Company also has recently completed an addition to office building, 40 x 62 feet, erected by same contractor.

Battle Creek, Mich.—Fire recently damaged a portion of the waste paper warehouse at plant of the Michigan Carton Company, East Fountain street, manufacturer of folding boxes and containers. An official estimate of loss has not been announced.

New York, N. Y.—The National Gypsum Company, 190 Delaware avenue, Buffalo, N. Y., manufacturer of wall board, insulating board and kindred products, has completed its new wall board mill at branch plant at East River and East 150th street, Bronx, in course of construction for a number of months past, as previously noted in these columns. The plant consists of several large one and multi-story production units and will be developed to maximum capacity at once.

Chicago, Ill.—The Lanzit Corrugated Box Company, 2425 South Rockwell avenue, manufacturer of corrugated boxes and containers, has awarded general contract to Gamm Brothers, 228 North LaSalle street, for improvements in boiler house at plant. Work will be placed under way at once. No estimate of cost announced. Fred G. Borg, company address noted, is engineer.

Los Angeles, Calif.—The Pioneer Flintkote Company, 5500 South Alameda street, Vernon, Los Angeles, manufacturer of roofing and building papers, and kindred stocks, is continuing expansion and improvements at mill, where new one-story addition is to be erected, 32 x 45 feet, lately noted in these columns. Company has taken out a permit for improvements and alterations in existing buildings at plant, reported to cost over $17,000, and will carry out work at once.

Easton, Pa.—The Individual Drinking Cup Company, Inc., 24th street and Dixie avenue, manufacturer of paper drinking cups, plates, etc., has superstructure nearing completion on new three-story addition to plant, 100 x 120 feet, for expansion in general production department, storage and distribution. Erection contract was let recently to the Lauter Construction Company, 1613 Sansom street, Philadelphia, Pa., as noted in these columns. It is reported to cost close to $100,000, and will be ready for occupancy in near future. Company is a subsidiary of the Dixie-Vortex Company, 421 North Western avenue, Chicago, Ill., which is now completing a six-story addition to the Chicago plant, to be equipped and placed in service for increased capacity at once. It will represent an investment of more than $150,000, with equipment.

New Companies

Boston, Mass.—The Bonded Fibers Corporation, 73 Tremont street, has been incorporated with capital of $100,000, to manufacture fiber products. Robert W. Schulz is president; and George F. Shulz, treasurer.

Meriden, Conn.—The Cameron Paper Company, 637 Center street, has filed notice of organization to deal in paper products of various kinds. Company is headed by H. B. Simmons, Saylesville, R. I.

New York, N. Y.—The Paper Export Trading Company, Inc., has been organized with capital of 200 shares of stock, no par value, to deal in paper goods of various kinds. New company is represented by Nachamie & Benjamin, 11 West Forty-second street, New York, attorneys.

New York, N. Y.—The Colonial Jewelry Box Company, Inc., has been chartered with capital of $20,000, to manufacture and deal in paperboard boxes and containers for special service.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending January 8, 1941

	High	Low	Last
A. P. W.	1¾	1¾	1¾
Armstrong Cork Co.	32¾	29	32⅝
Celotex Corp.	8½	7	8⅜
Celotex Corp., pf.	70	69	69½
Certain-Teed Products Corp.	4¾	4⅛	4⅛
Certain-Teed Products Corp., pf.	35¼	33⅝	34½
Champion Paper & Fibre Co.	20¼	19¾	20
Champion Paper & Fibre Co., pf.	103½	103½	103½
Congoleum-Nairn Co.	17¼	17	17¼
Container Corp. of America	15⅞	15¼	15½
Continental-Diamond Fibre Co.	7¾	7½	7⅝
Crown-Zellerbach Co.	15⅜	14½	15
Crown-Zellerbach Co., pf.	91⅝	90½	91⅝
Flintkote Co.	14⅞	14⅛	14½
Robert Gair	2½	2⅛	2⅛
Robert Gair, pf.	16⅜	16½	16⅜
International Paper & Power	15⅛	14⅞	14⅝
International Paper & Power, pf.	67¼	65	65⅞
Johns-Manville Corp.	62½	59⅝	62
Johns-Manville Corp., pf.	126¾	125½	125½
Kimberly Clark Corp.	37⅞	37½	37¾
MacAndrews & Forbes	....	....	....
MacAndrews & Forbes, pf.	....	....	....
Masonite Corp.	28	27	28
Mead Corp.	8⅞	8½	8⅝
Mead Corp., pf.	....	....	....
Paraffine Companies, Inc.	35¾	34¼	35¾
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	17	15⅞	16¼
Rayonier, Inc., pf.	28	28	28
Ruberoid Co.	17	16⅝	17
Scott Paper Co.	36½	36	36½
Scott Paper Co., pf.	112	111½	111½
Sutherland Paper Co.	23¼	22	22¼
Union Bag & Paper Corp.	12¾	12⅛	12⅜
United Paperboard Co.	3½	3¼	3½
U. S. Gypsum Co.	69½	65¾	69¼
U. S. Gypsum Co., pf.	....	....	....

New York Curb Exchange

High, Low and Last for Week Ending January 8, 1941

	High	Low	Last
American Box Board Co.	5	4¾	5
Brown Co., pf.	16½	15¾	16
Great Northern Paper	42	42	42
Hummel-Ross Fibre Corp.	6¼	6	6¼
National Container Corp.	12¾	10⅞	12⅝
St. Regis Paper Co.	2⅝	2¼	2½
St. Regis Paper Co., pf.	79½	79	79
Taggart Corp.	3⅜	3	3⅜

Hinde & Dauch Has Good Year

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., Jan. 6, 1941—Only direct and indirect export restrictions prevented Hinde & Dauch Paper Co., from establishing an all time high production record during 1940. As the record stands production for the year was approximately the same as in the previous year, according to L. F. Winchell, vice-president and general manager. The company experienced the busiest year of its history during 1939 and had there been no restrictions on exports during 1940, further gains would have been made as the company was not operating at its full enlarged capacity.

As these restrictions are likely to remain in force for the duration of the war, if not added to, and as domestic demands are difficult to predict, Mr. Winchell feels that it is impossible to forecast results for the new year. He emphasizes that the company is in the best position in its history to take full advantage of both ordinary demands and any peak that may occur.

In 1939 Hinde & Dauch reported net profits of $298,851, equivalent $1 a share on its common. Extremely low prices in 1939 more than offset the high volume of production, with the result that earnings were less than in 1938.

Newsprint Bonds Show Increase

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., Jan. 6, 1941—Canadian newsprint bonds were among the few securities to show advances during 1940. While other securities, generally speaking, did not show much change, newsprint bonds showed advances of as high as 25 points. The trend of values for the eight most actively traded newsprint bonds over the year shows that all are selling well above 1940 low points, while two issues closed the year at their highest peak.

The high, low and latest offerings for these eight securities reads as follows:

	High	Low	Latest Bid
Abitibi, 5's	72	42½	67½
Ca. Int. Paper, 6's	102¼	84	101¼
Con. Paper, 5½'s	74	46½	69½
Donnacona, 4½'s	82	65½	75½
Great Lakes, 5's	93	80	93
M. & O., 6's	52½	29½	52½
Lake St. John, 5½'s	92	84	89½
Price Bros., 5's	99	89	97

Debt in the Newsprint Industry

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., Jan. 6, 1941—In spite of all the talk about plans to avoid another industrial collapse after the war is over, the *Financial Post* of this city seems to intimate that it believes such a depression is unavoidable or inevitable. Speaking of the general necessity of both business firms and individuals getting out of debt now while business is good and getting better, the *Post* takes this crack at the newsprint industry: "Consider, as an example, how much turmoil would be avoided if our great newsprint industry were not loaded up with mortgage bonds, debentures and notes when the next depression comes."

The editorial continues by explaining the prepayment of debt helps the war effort. As debt payments flow back into the treasuries of insurance and mortgage companies, installment finance houses, and other business institutions, these firms will be able to reinvest the money in government war loans.

International Pulp Votes Dividend

International Pulp Company has declared an accumulations dividend of $1.75 on the 7 per cent preferred stock, payable January 2 to stockholders of record December 17. Arrears on January 1 amount to $5.25 a share.

American Box Votes Dividend

A dividend of 25 cents a share was voted on the common stock by the American Box Board Company. This is the first dividend since November 23, 1937, when 35 cents was paid.

Masonite Earns $343,257

Masonite Corporation, reports for the sixteen weeks ended December 21 a net profit of $343,257, after depreciation, Federal Income and excess profits taxes, etc., equal, after dividend requirements on 5 per cent

preferred to 58 cents each on 539,210 common shares. This compared with net profit of $441,059 or 77 cents a share for sixteen weeks ended December 23, 1939.

Sales amounted to $3,256,389 for the latest reporting period, compared with $2,619,316.

To Cease Operations at Walloomsac

GREENWICH, N. Y., January 6, 1941—The board of directors of the Stevens & Thompson Paper Company have petitioned the United States District Court for the Northern District of New York for an order to cease operations at their Walloomsac plant. This action is taken to comply with the plan of reorganization. The entire plant, except machinery for manufacturing paper food trays, is being offered for sale, or lease.

The paper food tray equipment is being moved to the Greenwich plant, where the manufacture and sale of Atlasta, sanitary, and Manhattan food trays will be continued.

The ceasing of operations at the Walloomsac plant in no way affects the Greenwich operation, where the Company will continue to produce toilet tissue, paper napkins, paper towelling and paper food trays.

Fort Wayne Pays Dividend

A 20-cent-per-share dividend has been paid by the Fort Wayne Corrugated Paper Company, which sent out checks totaling $45,000 to its stockholders.

The dividend is the first declared by the firm in two years.

The annual meetings of the stockholders and board of directors will be held on Saturday, February 22.

Southern Advance Nets $615,030

Southern Advance Bag and Paper Company, Inc. for the eleven months to November 30, reports a net income of $615,030 and net sales of $6,117,510.

Glatfelter Votes Dividend

The directors of the P. H. Glatfelter Company, paper manufacturers Spring Grove, Pa., have authorized the payment of a $5625 dividend to holders of the preferred stock. This will make a total dividend payment for the year 1940 of $11.50 a share.

It was announced at the same time that a Christmas distribution was made to more than 476 employes.

Standard Elects W. L. Goodwyn

The board of directors of the Standard Paper Manufacturing Company, at a meeting held at Richmond, Va., December 30, 1940, elected Mr. W. L. Goodwyn as vice-president, this being the same position held by Mr. Goodwyn prior to the recent reorganization of the company.

Western Tablet Nets $2.65

Western Tablet and Stationery Corporation for the year to October 31 reports a net income of $525,825, equal, after preferred dividend requirements, to $2.65 a share on 134,854 common shares, against $472,154, or $2.25 a common share in year ended October 31, 1939.

LONG LIFE
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ANOTHER
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THE CINCINNATI RUBBER MANUFACTURING CO.
CINCINNATI, OHIO

PAPER
TRADE JOURNAL
Title Reg. U. S. Pat. Off.
Henry J. Berger
EDITOR

Vol. 112 January 9, 1941 No. 2

COMING EVENTS IN PAPER INDUSTRY

AMERICAN PAPER AND PULP ASSOCIATION, Sixty-fourth Annual Convention and meeting, Waldorf-Astoria Hotel, New York, February 17-21.

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Convention, Roosevelt Hotel, New York, February 17-20.

SALESMEN'S ASSOCIATION OF THE PAPER INDUSTRY, Annual Meeting and Luncheon, Waldorf-Astoria Hotel, New York, Tuesday, February 18.

NATIONAL PAPER TRADE ASSOCIATION OF THE UNITED STATES, Convention, Waldorf-Astoria Hotel, New York, February 17-20.

THE NEW YORK ASSOCIATION OF DEALERS IN PAPER MILLS' SUPPLIES, Annual Banquet, Commodore Hotel, New York, Tuesday, February 18.

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

RISING BUSINESS ACTIVITY

As a new year opens with rising business activity the future is forecasted as likely to set up an all-time high record of industrial production and the largest national income ever attained. From business and financial reports received covering the three quarters of 1940 business apparently about equals the high record of 1929. The Federal Reserve index of industrial production rose from the low point of 130 last spring to 135 for December. Preliminary figures on the 1939 census of manufactures indicates that the total volume of all products in that year was $56,828,807,223. This is 16.6 per cent below the $68,178,340,248 produced in 1929, and 6.4 per cent under the $60,712,871,737 produced in 1937. After adjustment is made for the price changes in the several years, the volume of 1939 production exceeded that of 1929, when prices were 19 per cent higher; thus actual production in 1937 is computed just under that of 1929.

General business activity for the year 1940, according to the latest report, is estimated the highest on record. Incidentally, the monetary gold stock of the U. S. also reached a new high record of $21,982,000,000, compared with $17,644,000,000 in 1939 and with $6,829,000,000 in 1934. Individual incomes for 1940 are estimated by the Department of Commerce as the highest since the first quarter of 1930. The national income in 1940 is estimated at above $74,000,000,000, compared with $70,000,000,000 in 1939, and with $72,000,000,000 in 1937. Preliminary forecasts for 1941 estimate the national income at about $82,000,000,000, compared with $80,747,000,000 for the high record in 1929. Agriculture is expected to have a cash income in 1940 of about $8,700,000,000, including government payments of about $400,000,000, above that of 1939.

The rise in industrial activity in 1940 has been reported the most rapid since 1929 and while the largest gains have been made in the durable goods industries, earnings of many of the leading pulp and paper mills is estimated by competent authority to reflect a gain of 195.15 per cent. Total production of all kinds of paper and paper board for 1940 is expected to slightly exceed 14,300,000 tons and set up a new high record. Late reports indicate that despite the high costs of raw materials, increasing labor and other costs, many paper and pulp producers have been able to realize fair profits, in comparison with some other years, although current paper prices are relatively low. A comparison of the earnings reports of some of the leading concerns in the paper industry indicates that paper container manufacturers showed the largest gains with many pulp manufacturers a fairly close second. The figures are merely a general indication of an increase in earnings for the first three quarters of 1940, compared with the like period in 1939, when somewhat less than 500,000 tons of paper and paper board was produced. Total imports of wood pulp of all grades were over 1,084,000 tons; pulpwood, over 1,265,000 cords. Exports of wood pulp of all grades were over 414,000 tons. Imports of paper of all kinds were over 2,343,000 tons and exports over 502,000 tons. U. S. exports of all kinds were above the valuation of $4,000,000,000 for the first time since 1929.

The outlook for 1941 is for continued high production in the paper and pulp industry and increased consumption of paper and paper products in line with the expected increase in general business activity. In commenting on the outlook for this year *The Guaranty Survey*, issued by the Guaranty Trust Company of New York states in part that, "Thus far, the effects of the defense program on the fiscal position of the Government and on the general credit situation have hardly begun to appear. The financial requirements of defense will probably take various forms, but the most important consequence is likely to be a greatly accelerated increase in the national debt (now more than $45,000,000,000) and hence in the investments and deposits of the banks. Efforts will and should be made to meet a substantial part of the defense costs by means of higher taxes, although the tax burden on business cannot be increased too far without impairing productivity. And the Government will probably try to encourage the purchase of Treasury obligations by individuals and corporate investors. But if the cost of rearmament even approaches present estimates, it is difficult to escape the conclu-

sion that most of it must be raised by credit expansion."

In pointing out that all business should cooperate to the national need, the Survey goes on to say that, "The principal concern of business as it faces the beginning of a new year is to further the progress of national rearmament by every means in its power and at the same time to hold itself in the strongest possible position to meet any unexpected changes that the future may bring. It is universally recognized that the world has arrived at a critical point in its economic life and that objectives which would bulk large in business calculations at more normal times must now be subordinated to more fundamental considerations. The readjustments made necessary by the events of 1940 have been accomplished with a reasonable measure of success, but much more far-reaching ones are likely to be required before even the main outlines of the future can be foreseen with any clarity."

Having just stepped across the threshold of a new year it is too early to give more than a preliminary forecast of the future. From the opinions given and from the general consensus of competent opinion, it seems reasonably certain that the trend and volume of business, including paper, will be upward and in many industries production will be limited only by its capacity. Uncertainty exists now in respect to business profits and the possibility of changes in management-labor relationships, also in the relationship between industry and Government, taxes, price and wage policies and financing methods. However difficult the final readjustment of international relations and trade may be after the present conflict has terminated, the current year is expected to make a new high record of production and that must necessarily imply the greatest year of business activity in our history which in itself is a great accomplishment.

Timothy T. Maloney Dead

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., January 6, 1941—Timothy T. Maloney, for over fifty years with Carter, Rice & Co., passed away December 24 at his home in Needham, Mass., in his 84th year. "Tim," as he was familiarly called by his many friends, was well known among candy manufacturers all over the United States and Canada. In his capacity as head of the Candy Paper Department of Carter, Rice & Company he had visited not only all sections of this country, but also the West Indies, South America and Europe. In 1937 he retired from the company, but continued to enjoy his many hobbies, in which he was an expert.

His love of flowers expressed itself in the raising of fine specimens of many varieties, especially dahlias. He was a pioneer philatelist, and his interest continued to the end. His own collection was one of the best in this neighborhood and he was instrumental in starting many others in this hobby.

An unusual personality, a devoted friend, and a loyal member of the Carter-Rice organization during the last half-century has passed on.

Production Ratio Report

These statistics are based upon paper production reports to the American Paper and Pulp Association.

COMPARATIVE MONTHLY SUMMARIES[1]

Months	1940	1939	1938	1937	1936	1935	1934
January	90.2%	77.5%	63.9%	90.3%	76.1%	65.8%	.....
February	86.2%	81.7%	68.7%	90.1%	77.9%	70.0%	.....
March	83.9%	84.0%	69.6%	90.3%	76.0%	70.5%	.....
April	86.3%	82.9%	68.3%	92.1%	82.3%	70.0%	.....
May	91.8%	80.2%	69.0%	90.6%	81.6%	69.4%	.....
June	93.8%	79.7%	66.0%	87.3%	80.7%	72.3%	.....
July	87.1%	75.2%	72.0%	81.8%	77.3%	64.9%	.....
August	87.2%	82.9%	77.2%	82.9%	81.5%	70.9%	.....
September	83.2%	88.7%	76.3%	78.6%	80.5%	71.9%	58.2%
October	88.0%	96.6%	82.5%	73.5%	87.6%	75.6%	64.7%
November	86.9%	97.2%	79.6%	61.9%	88.0%	75.3%	61.7%
December	84.7%	91.1%	74.4%	54.5%	85.9%	71.2%	59.6%
Year Average	87.6%	84.9%	72.3%	80.6%	81.3%	70.5%	.....

COMPARATIVE WEEKLY SUMMARIES[1]

CURRENT WEEKS, 1940		CORRESPONDING WEEKS, 1939	
November 23	86.7%	November 25	96.2%
November 30	85.9%	December 2	95.1%
December 7	86.9%	December 9	96.6%
December 14	90.8%	December 16	97.7%
December 21	91.5%	December 23	93.9%
*December 28	64.4%	December 30	76.2%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting—Current Weeks					
Ratio Limits	Nov. 23, 1940	Nov. 30, 1940	Dec. 7, 1940	Dec. 14, 1940	Dec. 21, 1940	Dec. 28, 1940
0% to 50%	50	64	45	51	40	72
51% to 100%	248	232	251	242	231	132
Total Mills Reporting	298	296	296	293	271	204

PAPERBOARD OPERATING RATIOS

Per cents of operation based on "Inch-Hours" reported to the National Paperboard Association.

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1936	62%	67%	67%	70%	69%	70%	69%
1937	80%	86%	86%	88%	85%	77%	66%
1938	54%	60%	61%	57%	58%	56%	57%
1939	60%	67%	71%	69%	64%	67%	63%
1940	71%	70%	69%	70%	76%	79%	72%

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1936	75%	78%	82%	80%	74%	72%
1937	74%	69%	65%	55%	45%	73%
1938	66%	66%	70%	65%	59%	61%
1939	72%	74%	84%	81%	71%	70%
1940	74%	72%	79%	77%	71%	73%

Week end. Nov. 23, 1940—77%
Week end. Nov. 30, 1940—76%
Week end. Dec. 7, 1940—78%
Week end. Dec. 14, 1940—79%
Week end. Dec. 21, 1940—80%
Week end. Dec. 28, 1940—48%

[1] Production-capacity ratios are based upon six-day capacity ratings which are adjusted periodically to correspond with the ratings reported by individual companies. Ratios are subject to revision until all reports are received.

* Preliminary figure.

Sangamon to Start Soon

[FROM OUR REGULAR CORRESPONDENT]

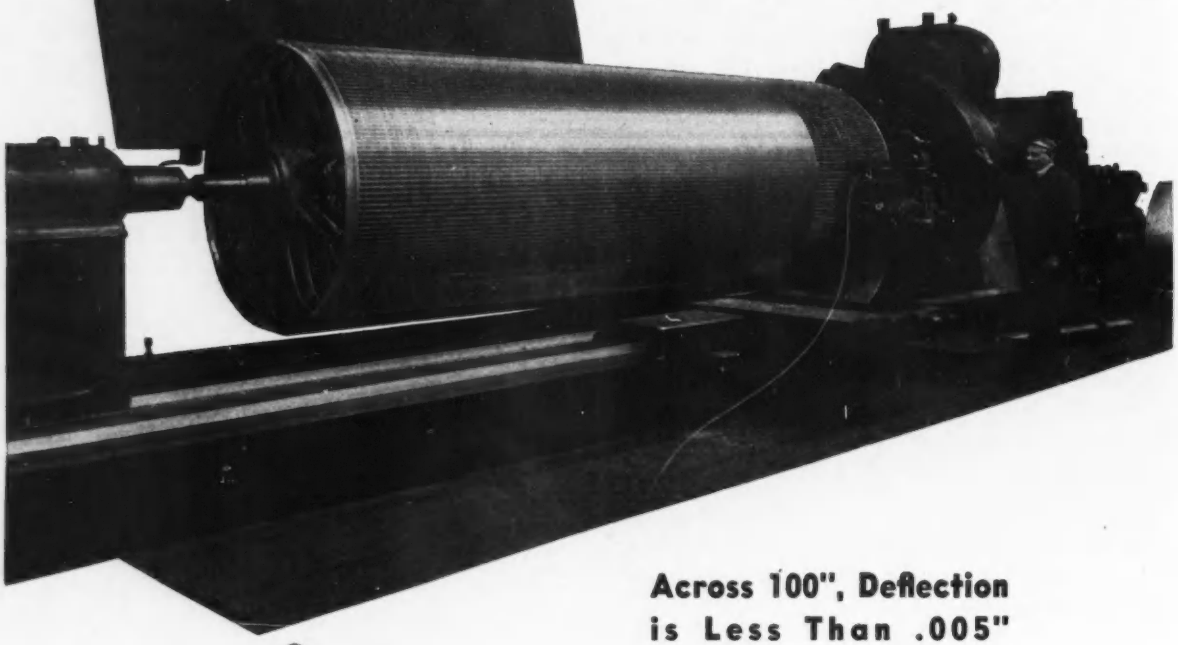
APPLETON, Wis., January 4, 1941—Operations will soon be started by the Sangamon Paper Grading Corporation of Chicago, Ill., at its recently acquired mill at Kaukauna, Wis. The property is the former Patten Paper Company mill, which the City of Kaukauna bought for the back taxes and sold to the Chicago buyers.

The mill has been awaiting power from the new hydro-electric plant under construction on the Patten water power site on the Fox River by the City of Kaukauna. Installation of a 2,400 kilowatt generator has been completed and test runs have been made, with the expectation that steady operations can be started this week.

The Sangamon company intends to manufacture kraft paper from waste. Extensive overhauling and repairs have been in progress for the last few weeks, and the boilers have been reconditioned.

DEFLECTION ALMOST NIL

IN THIS STRONG, LIGHT-WEIGHT MOLD



Across 100", Deflection is Less Than .005"

The Black-Clawson heavy-duty cylinder mold is ***built***. Spiders are ***individually clamped*** as the slots for the rods are cut into them. This means that across 100" of width, the deflection is less than .005", an almost negligible amount.

Attention to such details means that you get a superbly built cylinder mold in the Black-Clawson design. Here are some additional features:

Hollow, extra strong shaft on which are mounted fork-tailed spiders. As a protection against corrosion, bronze hubs completely cover the shaft.

Round rods are used. This means less power to turn the mold, a fact proven by actual tests which showed that flat rodded molds take up to five times the power requirements of a round rodded mold.

Rods are locked in place by pinning them against rotation.

Winding wire (stainless, bronze, or Monel) is wound tightly and accurately.

Backing wire cloth and facing wire cloth have welded or sewn seams.

Next Time, Specify Black-Clawson Cylinder Molds.

The Black-Clawson Co., Hamilton, Ohio.
Operators of Shartle Brothers and Dilts.

BLACK-CLAWSON

CYLINDER MOLDS

Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

Interdependence of the West Coast Log Family*

By W. G. Tilton[1]

Abstract

The markets, production, and uses of hemlock and Douglas fir logged in the northwestern part of the United States are discussed. Also the interdependence of the various timber interests comprising the west coast log family is discussed.

It is only in recent years that Douglas fir forestry has been focused, at least in a large way, on the markets for the forest products of the region. This is true to considerable degree of our west coast loggers whose direct interests do not extend beyond the booms. Our loggers and foresters have been overwhelmingly concerned with the cutting of trees and the growing of trees, and have largely ignored the use and marketing of those trees.

Market Relationships

Forestry in land use must be backed up by forestry in marketing and economics. We must learn to visualize our timber stands not only in terms of saw-logs, peeler logs, pulp logs, and types of new growth, but also in terms of houses, barns and box-cars; interior walls, showcases and boats; newspapers, shoe boxes, books, women's wear, shopping bags, and mountains of government printing; poles, posts, ties and Christmas trees; and trees too small for cutting but which begin to serve at an early age as a beautiful green cover for roadside lands and thus as an important attraction item for the northwest tourist industry.

What I have to say in the following minutes on facts and figures of the forest situation in the Douglas fir region bears directly upon the market relationships of the region's forest products. For our sawtimber, our sawlogs, in the lumber field alone we need a varied and balanced market, a need unparalleled in any other lumber-producing region. This means the development of a vast variety of markets for Douglas fir products, in order to secure the best possible returns from the log, and the best possible utilization of the log. The lumber products of west coast hemlock, and of western red cedar and Sitka spruce require special markets.

Here are obvious market relationships. Maintaining a balance is a constant problem for the west coast lumber industry. A swelling demand for two-inch home-building lumber coupled with a falling demand for industrial items creates, for example, a lopsided market for Douglas fir lumber. The effect of it goes right back to the sawlog and the stump. When hemlock demand for pulp use fails, hemlock logs must be left in the woods, or the sale of hemlock lumber must be promoted.

We cannot log what we cannot sell. We cannot take forest material out of the woods for which there is no market. If we are to maintain timber-growing land and protect the timber crop so it may be harvested and used, we must have dependable diversified markets for all the products of the crop. We need to build up the principle of one great unified, balanced market for the products of the saw-log, the peeler log and the pulp log, as the major guiding principle of forestry for the Douglas fir region.

Mature and Overtime Timber

First, in order to get our terms on a common ground, I will give some conversion factors. The Scribner & Spalding scales that are used to measure timber in the Douglas fir region show a thousand board feet, log scale, yielding approximately a ton of chemical pulp. Six hundred billion board feet of merchantable timber—that is, trees over 16 inches in diameter are standing in western Washington and Oregon, on some 14,000,000 acres of land. This timber is ready for use. For the most part the land is not active. It is, in effect, a 14,000,000 acre timber storehouse.

What do these billions of feet in storage mean, in terms of products and markets? In terms of a single general product, they mean 600,000,000 tons of pulp. All of our softwoods are suitable for pulp, and nearly one third are hemlock and true firs, woods which make the high grade pulps for which the pulp industry of this region is renowned.

Six hundred million tons of pulp is an astronomical amount. One cannot reduce it to terms of common understanding, even in quantities of newspapers and books. Six hundred billion feet of timber is also an inconceivable volume. It would provide lumber for almost double the number of existing family dwellings in the United States—twice 25,000,000 homes.

This incredible store of timber cannot, it is plain to see, find use solely in pulp products, or solely in

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home building. From the standpoint of good forestry it requires a far greater diversity of stable markets than we now have, and more stable, balanced marketing conditions.

Where It Goes Today

In the Douglas fir region of western Washington and Oregon, we are cutting this timber at a rate of from eight to nine billion board feet a year. About six to seven billion for lumber, a billion to a billion and a half for pulp, and another billion or so for plywood, shingles, fuel wood, and other uses. These figures are nearly unbelievable when one considers that approximately one third of the nation's timber is standing and nearly one third of its forest products are cut in this little corner of the United States.

In addition to these enormous reserves of mature and overmature timber, we have some other conditions peculiar to ourselves.

A look at the map will show our inland waterways. In the north there is the Strait of Juan de Fuca leading into Puget Sound; then we have Grays Harbor, Willapa Harbor and the Columbia River; all supply facilities for industrial plants and ocean shipping. In addition, the Willamette River, a tributary of the Columbia, is now open for transportation of logs for about 80 miles and will be extended another 80 miles; and along the western coast of Oregon there are bays from which logs can be rafted or barged to the Columbia River or Grays Harbor; and then in southwestern Oregon, Coos Bay is an industrial area, open to shipping to all parts of the world.

Nearly all of the timber in the Douglas fir region is within 50 miles air-line from one or more of these waterways. Compare these distances with the hauls for raw materials to manufacturing plants, or from manufacturing plants to shipping centers with other forest regions in the United States.

These waterways provide site facilities for the major wood-using industries of the region. On all of them there is cheap electrical power and good road and rail connections, and a diversity of wood-using plants such as pulp and paper mills, sawmills, shingle mills, plywood plants, furniture, boxboard, tub, and bucket shops. Furthermore, these waterways provide fine handling facilities for forest products in the form of sawlogs, poles, piles, bolts, or whatnot.

At very little expense the logs are unloaded into the waterways, sorted for use by species, size, and grade and made into rafts that are scaled and valued. Here log rafts may be stored for months, if need be, available for inspection and purchase by buyers for the various wood-using industries.

With these inventories of logs available, each buyer may choose the particular species, grade or type of log desirable for his particular plant. This permits each plant to secure the raw material most adaptable to his business, and gives us an opportunity to put logs to their highest use. The logs are moved about the waterways by tugs, towing up to a million feet, or the equivalent of a thousand tons of pulp, at a time. This water transportation is effected at a fraction of the cost of rail transportation over equal distances.

Industries on one waterway also supplement their log supply from one another. For example, high grade fir logs are now being floated down the Willamette River from the center of western Oregon to the Columbia River and shipped from the Columbia River to Grays Harbor and Puget Sound by rail. Similarly, spruce, cedar, and hemlock logs are shipped daily from Grays Harbor to Puget Sound. This all adds up to commercial log markets similar to the markets for agricultural and other commodities. These commercial log markets are found in practically no other part of the world. They give us the best possible opportunities for utilizing the various types of raw material grown in our forests. Many of our plants do control their own log supply, but most of these sell the products not suitable for their own plants and augment their own supplies from the open market.

Growth vs. Depletion

An increasing amount of our timber is deteriorating annually, like the old wheat that has been stored too long in the midwest. And it takes up a vast amount of forestland acreage on areas throughout the region which ought to be producing new timber crops, a future supply for forest markets. In short, these 14,000,000 acres now used for the storage of 600,000,000,000 feet of timber also represent great productive capacity. We have 11,000,000 acres already in timber production. When the 14,000,000 acres now used for timber storage are eventually put into active production, then our supply for forest markets can be sustained on a basis of real forestry. We can then grow more timber than we may hope to sell.

You've probably heard that we in the Douglas fir region are cutting timber four times as fast as it is growing. That is a worse distortion of fact than was ever made in a war communique. It is the same as saying that an acre of farm land that will produce thirty bushels of wheat and with the thirty bushels standing at harvest time, will not grow any wheat that year. That growth applies only on timber stands over 16 inches in diameter, and most of these stands have already reached maturity or decadence. It does not take into account any growth on the timber stands that you are familiar with in all other forest regions, of cord and pole sizes. Our log scales are designed primarily for the measurement of sawlogs.

With intensive forestry, the region will annually grow fourteen or fifteen billion board feet, or enough for at least a 50% expansion. If the pulp technicians will help us by finding ways and means for using the thinnings from this growth, the expansion can be ever greater.

Now, some more facts on growth. Many of our forest areas will grow the wood to supply a ton of chemical pulp per acre per year, some acres two tons; or, the annual growth alone on a square mile will run a 100-ton pulp mill a week; or on 50 square miles, for a year. That means that on some of our areas a 100-ton pulp mill could be supplied perpetually from the forest growth within a five-mile radius; and there would still be 20,000 acres in the area for farms and industrial use.

This growth is only a part of the story on supplies of raw material. When the eight or nine billion board feet is logged in the woods each year, enough wood is left behind for three million tons of cellulose. I believe this is more than the entire cotton crop of the nation. This material is not left because of any wish of our loggers to be destructive; it is left purely and simply because at the present time there is no market for this material. It is the timber that is partially defective and unsuitable for lumber manufacture;

timber pieces too small to be economically handled; or logs of small diameter.

Why isn't the attempt made to use it? It has been tried. Pulp mills, fiberboard plants, barrel factories, charcoal burners, hog-fuel plants, and other manufacturing plants have been designed to use this waste and the additional waste from our sawmills. Some have done so for a few years, but ultimately, all have found that our commercial logs, raw material in large sizes, can be handled so much more cheaply that even free wood waste is not attractive.

Transportation and Labor

We are located here in the northwestern corner of the United States, two or three thousand miles by rail from the principal consuming markets of the country. Rail transportation at $16.00 a ton for lumber takes away a lot of our other advantages. Water transportation is good to California and some western markets; but it is 7000 miles from here to the Atlantic coast markets via the Panama Canal as compared to the 3000 miles to the Baltic countries, against whom we have no tariff protection. Of course, we do not need this at the present time, due to war in Europe.

Our minimum wage in most of the northwest woods is 62.5 cents an hour, and the average is above 80 cents an hour. I believe that only because of the Wage and Hour Law do some of our competitors pay as much as 30 cents. And labor is organized here. Labor in our own plants may be fully satisfied, but a strike among longshoremen, seamen, or some industry producing necessary equipment or materials, may close our plants for protracted periods and shut down our operations. Shutdowns are expensive.

Should the Sawlog Pay the Bill

The hemlock and true firs grow mingled with the Douglas fir. Until now their logs have been produced as byproducts of Douglas fir logging. Because they were a byproduct, they have been available for pulp at a relatively cheap price. Some of you from other regions will consider $8.00 to $14.00 for a ton of pulp in the form of logs a high raw material cost. However, in terms of cost of production in the Douglas fir region, cost which runs from $12.00 to $16.00 per ton, you can see that such prices are very reasonable. The reason this has been possible is that in the past the Douglas fir sawlog has stood the fixed cost. By that I mean stumpage, construction costs, most of the depreciation for equipment, and so forth.

It has been possible to get out hemlock by charging only the actual labor and material costs against it. This probably has been sound business for our loggers; but with our timber stands, particularly in the northern part of the region, showing a much higher percentage of hemlock, it soon will become economically impossible to consider hemlock as a byproduct and it will have to stand on its own feet, or its own roots, which will mean a marked increase in raw material prices for this product. There is also the possibility that as the percentage of Douglas fir in our timber stands declines, hemlock will come back into favor for lumber. It makes good lumber—is matchless in several uses—as a softwood flooring, for example. We used to sell more for lumber than is now being used for pulp.

This region has the capacity to produce timber to meet any future needs that can now be practically conceived. And we know that all the forest industries of the region have a unity of interest in forest markets, an interdependence in the balanced use and purchase by the American people of all the things that can be made from the harvest of the west coast timber crop.

Delaware Valley TAPPI Discusses Driers

The January meeting of the Delaware Valley Section of the Technical Association of the Pulp and Paper Industry was held Friday evening, January 3, 1941, at the Engineers Club. John Roslund of the Asten-Hill Corporation, Philadelphia, Pa., presented a paper on drying on the paper machine.

Results were given obtained from tests on the machine having no forced circulation of air between the driers and no felt driers. It was found that approximately 80% of the water was removed while the sheet was in contact with the driers, and 20% when the sheet was free. It was also found that there was little drying while the sheet was traveling from the top to the bottom drier, although there was when the sheet traveled from a bottom to a top drier. Moist air trapped in the nip between the drier and paper and between the paper and felt on the top drier when the paper was leaving the top drier was given as an explanation for the difference. It is believed that when increased drying capacity is desired felt driers should be used.

The use of forced air circulation between driers improves quality, although it does improve drying capacity to some extent.

Mr. Roslund brought up the point that a great deal of work has been done on the wet end of machines to improve speed and water removal, but that aside from adding more driers and using forced air circulation and felt driers, no changes have been made in the drier section itself. Possibly worthwhile results would be obtained by such changes.

The question of different speeds for each drier and reduced diameters of driers from the wet to the dry end were mentioned.

An interesting discussion followed, principally on forced air circulation versus felt driers.

The recent loss to the industry of Dr. Carleton E. Curran, chief of the paper section of the United States Forest Products Laboratory was observed by remarks by R. G. Macdonald, secretary of TAPPI and E. J. Albert, chairman of the Delaware Valley Section.

There were 54 people present at dinner, and 72 at the meeting. Among those present were: Edw. J. Albert, J. R. Atwater, Roy E. Bare, R. T. Bingham, Alan R. Boyd, J. M. Chesnutt, John Cochran, C. M. Connor, A. M. Cooper, J. D. Davis, Amos Dottrini, Paul Easton, George A. Farrah, H. J. Farra, James H. Fritz, J. D. Gercke, J. F. Good, J. L. Granel, Samuel Hagner, L. V. Hans, H. F. Hoffmann, Harry Hulmes, V. Jacobsen, Leslie Justice, J. J. Lafferty, P. M. Loddengaard, F. J. McAndrews, R. G. Macdonald, Louise E. McGrath, George B. Martin, M. Craig Maxwell, L. B. Miller, Walter B. Morehouse, A. H. Nadelmann, J. F. Ohlson, M. B. Pineo, E. N. Poor, Walter P. Quinn, Sam Reynolds, C. W. Revise, A. Pehnabel, J. Carl Schmidt, Frank F. Schrier, Edw. A. Shallcross, Henry C. Speel, E. I. Stokes, Howard H. Street, Richard O. Temple, John N. Tuttle, R. H. Underdown, A. E. Waugh, and Edmund A. Yerger.

The Theoretical Basis for the Action of Sulphide in the Kraft Pulping Process

By Fred S. Hanson[1]

Abstract

Wood can be completely pulped with sodium hydrosulphide alone. The minimum total chemical, calculated as NaOH, which is required for complete pulping increases with the sulphidity from a value in the neighborhood of 20 per cent, based on the weight of wood, for NaOH to about 40 per cent for sodium hydrosulphide. As a result, when an intermediate value for the total chemical is employed, a certain minimum amount of NaOH must be present for successful pulping. The optimum sulphidity for the kraft pulping process is primarily dependent on the total chemical employed and may readily be predicted for any given total chemical on the basis of the linear relationship established in this work. The optimum sulphidity was found to be independent of the liquor concentration in the range studied, namely, 1 to 6 per cent. Support of the assumption that sodium sulphide is essentially completely hydrolyzed in liquors of such concentration at cooking temperatures is found in this result.

The active pulping reagents in a kraft liquor are NaOH and sodium hydrosulphide. The pulping action of sodium hydrosulphide involves the introduction of sulphur atoms into the lignin molecule. A maximum sulphur content in the neighborhood of 10 per cent, corresponding, on the basis of a molecular weight for lignin of 850, to three sulphur atoms per molecule, was found for the alkali lignins recovered from cooks employing a hydrosulphide component. The introduction of sulphur groups into the lignin molecule was favored to increase with the sulphidity and, where sodium hydrosulphide alone was employed, with increased concentration, temperature, and cooking time, although, presumably due to a continued action of the liquor on the initial products of reaction leading to a decomposition of the lignin-sulphur compounds, more drastic action in the form of sufficient increase in any of these conditions lead to an ultimate decrease in the amount of sulphur found in the recovered alkali lignins. Apparently sodium hydrosulphide itself will not remove lignin from the wood until at least one sulphur atom has been introduced to the lignin molecule.

Based on these results, the theory is advanced that sulphide speeds up the pulping action in alkaline cooks because the sulphur groups introduced into the lignin increase its acid character and make it more readily soluble in the alkaline digestion medium. Optimum conditions occur when a proper balance between the two postulated types of reactions occur, namely, that whereby sulphur groups are introduced to the lignin molecule, favored by an increase in the hydrosulphide component of the liquor, and that whereby the lignin is dissolved out of the wood, favored by high concentrations of hydroxyl ions.

A portion of a thesis submitted in partial fulfillment of the requirements of The Institute of Paper Chemistry for the degree of Doctor of Philosophy from Lawrence College, Appleton, Wis., June, 1939. This work was carried out under the guidance of D. Romund Moltzau.

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Introductions

The addition of sulphide to a soda cooking liquor results in a stronger pulp and increases the rate of delignification. It has been variously observed, however, that the increase of pulping rate with increasing proportion of sulphide does not hold over the whole range of sulphidities but that there is, in general, an optimum sulphidity beyond which further replacement of caustic by sulphide results in an ultimate decrease in pulping rate. The present investigation is concerned with the mechanism by which the increased rate of delignification is brought about and with the fundamental conditions upon which rests the occurrence of the aforementioned optimum sulphidity.

The experimental evidence reported in the literature to the effect that the delignification process in alkali pulping is accelerated by the presence of sulphide is quite extensive and need not be reviewed here. A number of theories have been advanced to explain the effects of sulphide in the pulping process which variously include suggestions that: (1) it aids penetration of the liquor into the wood by raising the osmotic pressure; (2) it maintains a reducing atmosphere in the digester; (3) it acts as a demethylating agent; and (4) it acts catalytically. The experimental evidence does not support any of the above suggestions as being anything more, at best, than partial explanations of the effects involved. A more acceptable view, well supported by experimental fact, maintains that the more rapid action of kraft cooking liquors depends on the formation of sulphur groups in the lignin molecule with attendant increased solubility of the lignin.

Kullgren *(1)* has offered considerable experimental evidence in support of this explanation. Since the hydrolysis of sodium sulphide in moderately dilute solution is so nearly complete at room temperatures, Kullgren concluded that essentially only NaOH and sodium hydrosulphide are present in kraft liquor at cooking temperatures and that these two compounds are the active pulping reagents. The sodium hydrosulphide, itself a weak digestion medium, reacts with the encrusting materials of the wood and forms sulphur compounds which are more easily attacked by the soda liquor than the sulphur-free substance. Kullgren digested wood with pure sodium hydrosulphide but in none of his experiments did he obtain a yield lower than 70 per cent. Digestions of wood with NaOH produced the same yield in a shorter time with less chemical. However, when both these products were later digested with NaOH, it was found that the chips which had been precooked with sodium hydrosulphide pulped considerably faster. The data showed that the higher the sulphur content of the chips obtained in the sodium hydrosulphide cooks, the more rapid the subsequent digestion.

The existence of an optimum sulphidity has been

noted by various investigators with wide disagreement as to the point of its occurrence. Hägglund and Hedlund *(2)* found that delignification was only slightly better at a sulphidity of 31 per cent than at 15.6 per cent, and concluded that there was no advantage in going higher than the latter value. Kress and McGregor *(3)* reported that delignification was at a maximum and that the best pulp was produced at a sulphidity of 33.3 per cent. This result was confirmed by unpublished work more recently carried out at The Institute of Paper Chemistry. Johansson's results *(4)* indicated that maximum delignification occurred between 25 and 50 per cent sulphidity. Working with a large excess of chemical, Mitchell and Ross *(5)* pulped successfully at 100 per cent sulphidity—at a much faster rate, in fact, than in a comparable solution of 33 per cent sulphidity.

Relative to this situation the latter authors may be quoted as follows: "It is a generally accepted view that whereas the addition of sodium sulphide to a solution of NaOH causes a more rapid pulping of coniferous woods, the substitution of sodium sulphide for more than a certain proportion of the NaOH in the pulping liquor leads to a diminution of the pulping power of the liquor. This is only true where the conditions of the experiment are mainly substantially close to those now used in commercial practise." Mitchell and Ross go on to point out that Kress and McGregor obtained poor delignification at high sulphidities, because they worked at a fixed total chemical of 20 per cent of the weight of the wood and that consequently, at the higher sulphidities, there was insufficient alkalinity present.

Some interesting facts with an apparent bearing on the causes underlying the occurrence of an optimum sulphidity may be brought out by reviewing the available data in regard to the limiting conditions for adequate kraft cooking as experienced by various investigators. The data of Hägglund and Hedlund *(2)*, Kress and McGregor *(3)*, Surface and Cooper *(6)*, Potter *(7)*, Bray and Curran *(8)*, Johansson *(4)*, and Klason (quoted by Hägglund *(9)*, have been recalculated to a comparable basis and summarized in Table I. The total chemical content of the respective cooking liquors has been expressed in terms of percentage of NaOH on the basis of the moisture-free weight of wood used and sulphidity according to the TAPPI definition, i.e., as parts of sulphide per 100 parts of total titratable alkali, all expressed on an equivalent basis. The total NaOH including that present by virtue of an assumed complete hydrolysis of sodium sulphide was calculated and expressed as percentage of the moisture-free weight of wood. This quantity has been designated as "effectual NaOH."

TABLE I.—MINIMUM EFFECTUAL HYDROXIDE

Investigator	Total chemical as NaOH %	Sulphidity %	NaOH for good pulping, min. effectual %
Hägglund and Hedlund.....	24.0	31	20.2*
Bray and Curran.....	20.2	33	16.7
Kress and McGregor.....	20.2	40	16.1
Institute of Paper Chemistry...	20.0	50	15.0
Surface and Cooper.....	19.7	60	15.9
Johansson	26.7	75	16.7
Johansson	(26.7)	(90)	(14.6)**
Klason	27.5	85	15.8

* Lowest value investigated
** Not quite effective

Presented in this light, the data from all the sources listed show an approximate agreement in the neighborhood of 15 or 16 per cent for the minimum amount of "effectual NaOH" which was required for effective pulping. The result appears to hold for the total chemical range (as NaOH) of 19.7 to 27.5 per cent. It is also to be noted that Johansson and Klason, who used higher percentages of total chemical were able to pulp successfully at higher sulphidities than the other investigators.

On the basis of the above data, it might be superficially concluded that effective pulping depends upon the presence of a definite minimum of NaOH. However, in the experimental work reported later in this paper it was found that wood could be effectively pulped with pure sodium hydrosulphide, and that the limiting composition of the liquor for complete pulping, as well as the position of the optimum sulphidity, depended primarliy on the total chemical employed rather than on the "effectual NaOH" present.

Furthermore, the possibility that pulping rate falls off at high sulphidities because of insufficient hydroxide is not supported by results obtained *(5)*, where large amounts of chemical, always maintaining an excess of "effectual NaOH," were used and optimum effects were still observed. With solutions of 1.0 per cent concentration, it was found that delignification was progressively more complete as the sulphidity was increased to 50 per cent, beyond which point an increase in the proportion of sulphide caused no change in the lignin content of the pulp or in the yield. At concentrations of 1.5, 2.0, and 3.0 per cent a fairly definite optimum was observed at 50 per cent sulphidity. These results show that delignification rate does not continue to increase with increasing sulphidity even in the presence of excess NaOH except, perhaps, in the case of quite dilute solutions.

If the behavior of sulphide is different in dilute solutions, as the above possibility suggests, the difference might be traceable to a variation in the degree of hydrolysis. No direct measurements of the extent to which sodium sulphide is hydrolyzed at cooking temperatures have been successfuly made. The available data *(11)* indicate that, depending on the concentration, the hydrolysis is from 60 to 90 per cent complete in moderately dilute solutions at ordinary temperatures. Opposed to the above indirect and questionable evidence that hydrolysis is a critical factor in the pulping behavior of sulphide solutions are other results also obtained in some excellent studies of the kinetics of the soda and kraft pulping processes *(12, 13)*. The reaction rate constants, which were obtained for the main delignification reaction with pure sodium sulphide, were found to increase linearly with an increase in the concentration of sodium sulphide in the range studied (0-6 per cent solutions). This implies that there was no change in the degree of hydrolysis of sodium sulphide with change in concentration at the temperatures involved. Results obtained in the course of the present work support this conclusion.

Experimental Results

Effect of Liquor Concentration on Optimum Sulphidity

Three series of pulping experiments were made with liquors containing 1, 3, and 6 per cent total chemical, respectively. In all cases an amount of total

TABLE II.—EFFECT OF CONCENTRATION ON OPTIMUM SULPHIDITY

Sulphidity %	Parts NaOH	Parts NaSH	Yield %	Lignin in pulp %	Residual lignin %	Residual carbohydrate %
Digestions at 1% concentration; liquor volume 4500 cc.; 1 hr. to 170 deg. C., 2 hr. 35 min. at 170 deg. C.						
0	50.0	0	60.20	23.88	14.38	45.82
33	41.7	8.3	60.80	23.58	14.34	46.46
60	35.0	15.0	60.47	22.76	13.77	46.70
100	25.0	25.0	53.45	19.40	10.37	43.08
120	20.0	30.0	59.55	21.65	12.90	46.65
Digestions at 3% concentration; liquor volume 1500 cc.; 44 min. to 170 deg. C., 65 min. at 170 deg. C.						
0	50.0	0	60.10	25.40	15.27	44.83
33	41.7	8.3	49.60	10.60	5.26	44.34
60	35.0	15.0	49.30	10.10	4.98	44.32
100	25.0	25.0	47.50	6.20	2.95	44.55
120	20.0	30.0	48.55	7.21	3.50	45.05
Digestions at 6% concentration; liquor volume 750 cc.; 36 min. to 170 deg. C., 40 min. at 170 deg. C.						
0	50.0	0	52.60	15.43	8.13	44.47
33	41.7	8.3	51.80	14.04	7.27	44.53
60	35.0	15.0	50.90	13.68	6.96	43.94
100	25.0	25.0	51.60	13.27	6.85	44.75
120	20.0	30.0	53.03	12.96	6.87	46.16

chemical equal to 50 per cent of the moisture-free weight of the wood was employed in order that the NaOH present would exceed a minimum value of 16 per cent at the highest sulphidity studied. The weights of chemical were calculated in terms of NaOH.

The digestions were made with 90-g. batches of black spruce planings in a 5-liter stainless steel autoclave heated in a wax bath. The liquors were made up with C.P. sodium hydroxide, C.P. sodium hydrosulphide, and distilled water. An arbitrary cooking time was chosen for each concentration of cooking liquor used. The temperature schedule found easiest to follow in the first cook at each concentration was followed exactly in the succeeding cooks at that concentration. The product was washed very thoroughly with cold tap water on a filter cloth and Büchner funnel. Lignin was determined on the product by the H_2SO_4 method *(17)*. The data are presented in Table II where the values given for "residual lignin," showing the relative degree of cooking obtained at the respective sulphidities, represents the percentage of lignin remaining in the pulp on the basis of the original moisture-free weight of wood. The values for "residual carbohydrate" were obtained by subtracting the values for "residual lignin" from the yields.

Effect of Total Chemical on Optimum Sulphidity

In order to supplement the data already on hand, three series of cooking experiments were made employing 35, 40, and 65 per cent total chemical based on the weight of wood. The cooking procedure and method of calculation were essentially the same as described in the preceding section. The data are given in Table III.

The Pulping Behavior of Sodium Hydrosulphide

In an initial series of experiments, 6 digestions

TABLE III.—EFFECT OF TOTAL CHEMICAL ON OPTIMUM SULPHIDITY

Cook	Sulphidity %	Yield %	Lignin in pulp %	Residual lignin %	Residual carbohydrate %
35% Total chemical; 3% concentration; 60 min. to 170 deg. C., 70 min. at 170 deg. C.					
23	50	49.80	7.44	3.71	46.09
20	60	49.95	7.03	3.51	46.44
21	70	49.75	6.51	3.24	46.51
22	80	52.10	8.89	4.63	47.47
40% Total chemical; 3% concentration; 62 min. to 170 deg. C., 65 min. at 170 deg. C.					
16	70	51.35	7.42	3.81	47.54
17	80	51.70	7.08	3.66	48.04
18	90	50.34	8.63	4.34	46.00
19	100	54.00	11.04	5.96	48.04
65% Total chemical; 3% concentration; 48 min. to 170 deg. C., 60 min. at 170 deg. C.					
65AR	100	50.90	6.40	3.26	47.64
65BR	120	48.50	4.97	2.41	46.09

were carried out on spruce shavings using pure sodium hydrosulphide as the pulping agent with 20, 30, and 40 per cent total chemical (calculated as NaOH) for 3 hr. at 160 deg. C., and with 20, 25, and 30 per cent total chemical for 4 hr. at the same temperature. The digestions were made three at a time in iron tubes contained in the digester previously described. Cooks 31, 32, and 33 were thus made simultaneously as were Cooks 34, 35, and 36.

As a matter of possible interest the pH values of the cooking liquors before and after digestion were determined with a glass electrode.

The dissolved lignin in the black liquor was precipitated and purified previous to determinations of methoxyl, sulphur, and ash contents according to the method of Marshall, Brauns, and Hibbert *(14)*. The product obtained by this method is called Alkali Lignin A and represents the principal fraction of the lignin least modified by the cooking process.

The methoxyl content of the alkali lignin was determined according to the semimicro method of Zeisel. The sulphur content was determined by the Carius method. The ash content was likewise determined. The sulphur content of the pulps was determined according to a procedure recently described by Klingstedt *(15)*.

The results of this initial series of experiments are shown in Table IV. In calculating the number of sulphur atoms per molecule of lignin, a molecular weight of 850 for the latter, as given by Brauns and Hibbert *(16)*, was assumed.

A second series of 4 cooks was made simultaneously, in a manner similar to that described in the preceding section, in which the cooks were held at the maximum temperature for a relatively long period of time in order that the reaction might run more nearly towards completion. The 4 cooks were made at a liquor concentration of 3.8 per cent. The data obtained are shown in Table V.

The experiments represented by Tables IV and V were made on spruce shavings. One hydrosulphide cook was carried out using chips, the wood in this

TABLE IV.—DIGESTION OF SPRUCEWOOD WITH SODIUM HYDROSULPHIDE

All cooks at 160 deg. C., 65 min. to maximum temperature, 400 cc. volume

Cook	Total chemical %	Conc. %	Time at max. temp. hr.	pH White liquor	pH Black liquor	Yield %	Lignin in pulp %	Residual lignin %	Residual carbohydrate %	MeO in alkali lignin %*	Ash in alkali lignin %	S in alkali lignin %	S Groups in alkali lignin	S in pulp %	S in pulp % of lignin in pulp
31	20	2	3	11.57	10.54	64.80	22.29	14.44	50.36	13.19	2.23	6.05	1.7	0.402	1.80
34	20	2	4	11.57	10.55	65.10	22.47	14.63	50.47	11.67	1.81	7.79	2.2	0.416	1.85
35	25	2.5	4	11.50	10.94	58.94	17.76	10.47	48.47	13.13	2.59	7.59	2.1	0.259	1.46
32	30	3	3	11.43	11.13	54.50	12.60	6.86	47.64	13.36	0.52	6.80	1.9	0.206	1.64
36	30	3	4	11.43	11.15	54.90	13.12	7.20	47.70	12.40	2.50	7.64	2.1	0.257	1.96
33	40	4	3	11.30	11.19	50.60	5.77	2.92	47.68	13.12	2.04	10.72	3.0	0.178	3.08

* Corrected for ash content.

TABLE V.—AMOUNT OF HYDROSULPHIDE REQUIRED FOR COMPLETE PULPING

All cooks at 3.8 per cent concentration; pH of white liquors 11.33; 1 hr. 10 min. to 170 deg. C., 8 hr. at 170 deg. C.

Cook	NaSH %	Volume cc.	pH Black liquor	Yield %	Lignin %	Residual lignin %	Residual carbohydrate %	S in alkali lignin %	S Groups in alkali lignin	S in pulp %	S in pulp % of lignin in pulp
41	30	300	10.94	55.20	21.51	11.87	43.33	5.26	1.5	....	....
42	35	350	11.08	45.65	8.90	4.06	41.59	5.52	1.6	....	....
43	40	400	11.18	40.00	2.68	1.07	38.93	5.12	1.5	0.152	5.67
44	45	450	11.08	36.95	1.85	0.68	36.27	4.82	1.3	0.236	12.76

TABLE VI.—EFFECT OF LIQUOR COMPOSITION ON SULPHUR CONTENT OF LIGNIN

Conditions for all cooks: 3% concentration, 40 g. wood, 1 hr. to 170 deg. C. 30% total chemical, 400 cc. liquor, 1½ hr. at 170 deg. C.

Cook	NaOH %	NaSH %	Yield %	Lignin %	Residual lignin %	Residual carbohydrate %	S in alkali lignin %	S in pulp %	S in pulp % of lignin in pulp
51	75	25	47.95	6.93	3.33	44.62	6.10	0.187	2.70
52	50	50	49.60	7.13	3.54	46.06	8.85	0.255	3.60
53	25	75	50.70	9.59	4.86	45.84	9.38	0.348	3.60
54	0	100	53.10	11.00	5.84	47.26	9.88	0.385	3.50

case being southern pine. The results obtained were quite comparable with those obtained using shavings, showing the efficacy of hydrosulphide as a pulping agent to be quite the same in either case.

It may be of interest to mention that the sodium hydrosulphide cooks were characterized by a peculiar odor which was different from the usual mercaptan odor of kraft cooks.

The product obtained in Cook 33, representing the shorter cooking period at a total chemical of 40 per cent, was fully pulped. When the pulp was first washed it was dark gray-green in color, but on standing it soon turned to a red-brown. It appeared to be a good strong pulp as might be expected from the high figure for residual carbohydrate. The alkali lignins obtained were, in general, a light brown in color. The appearance of these products was quite similar to that of the product which may be obtained by dissolving Willstätter lignin in pure sodium sulphide and precipitating with acid.

The Sulphur Content of the Dissolved Lignin

Effect of Sulphidity. Four cooks were made simultaneously with liquors whose chemical content consisted of 25, 50, 75, and 100 mole per cent of sodium hydrosulphide, the other component being NaOH. Particular care was employed in purification of the alkali lignins recovered in these experiments. The results are given in Table VI.

Effect of Concentration in Hydrosulphide Cooks. The results of 2 hydrosulphide cooks at very high liquor concentrations are shown in Table VII. The procedures employed were the same as those previously described, except that a small autoclave of 350 cc. capacity was used. The alkali lignin obtained in Cook 7S was a fairly dark red-brown, while that obtained in Cook 10S was a deep blue. It may be of some significance that the light brown lignin products

TABLE VII.—DIGESTIONS WITH HIGH CONCENTRATIONS OF HYDROSULPHIDE

Cook 7S: 30 g. wood, 300 cc. liquor, 66% total chemical, 6.6% concentration, 30 min. to 165 deg. C., 4½ hr. at 165 deg. C.

Yield %	Lignin %	Residual lignin %	Residual carbohydrate %	S in alkali lignin %	S in pulp %	S in pulp % of lignin in pulp
38.55	2.15	0.83	37.72	5.02	0.139	6.47

Cook 10S: 25 g. wood, 250 cc. liquor, 102% total chemical, 10.2% concentration, 35 min. to 165 deg. C., 4½ hr. at 165 deg. C.

33.70	1.50	0.50	33.20	5.30	0.278	18.53

obtained in previously described experiments at lower liquor concentrations passed rapidly through a red-brown and a deep blue stage upon addition of the nitric acid used in the sulphur determination.

Effect of Temperature in Hydrosulphide Cooks. Four hydrosulphide cooks were made, respectively, at 130, 140, 150, and 170 deg. C. The results, supplemented by that of Cook 33 (at 160 deg. C.), which has been previously described, are shown in Table VIII.

A study of the bleaching properties of the pulps produced indicated that bleach consumption at a given lignin content tended to increase with sulphur content, but that the effect was of secondary importance.

It was observed that the sodium hydrosulphide liquors had a quite highly corrosive action, the dissolved iron being present in the ferrous condition. This fact has previously been observed by Kullgren *(1)*.

Discussion of Results

The data presented in Table II clearly show the nondependence of the optimum sulphidity on the chemical concentration of the liquor. At each of the three concentrations studied, a total chemical of 50 per cent being used, the residual lignin decreased with increasing sulphidity up to a value for the latter of 100 per cent when an optimum was obtained. This result supports the assumption that at cooking temperatures the hydrolysis of sodium sulphide in such solutions is essentially complete and is therefore not a critical factor in the establishment of optimum effects.

In accord with previous results obtained *(5)*, the values in Table II for residual carbohydrate are, in general, quite uniform. The action of soda liquors does not appear to have been more drastic than that of the kraft liquors. The results of Cooks 7S and 10S (Table VII) show that even with sodium hydrosulphide alone, considerable loss of carbohydrate

TABLE VIII.—EFFECT OF TEMPERATURE ON SULPHUR CONTENT OF LIGNIN

Conditions for all cooks: 40% total chemical, 4% concentration, 65 min. to temperature, 3 hr. at temperature

Cook	Temperature deg. C.	Yield %	S in alkali lignin %
130	130	63.50	4.92
140	140	59.10	6.01
150	150	50.10	8.63
33	160	50.60	10.72
170	170	43.40	6.48

material can occur if exposed to the action of a large amount of chemical for a sufficient time. From consideration of these facts, the probability presents itself that the favorable preservation of carbohydrates in an ordinary kraft cook as compared to a soda cook is due to the more rapid pulping action, allowing, for a given chemical content, a shorter period of exposure to the reactants. If it is attempted to delignify the wood as thoroughly with a soda liquor as with a kraft liquor of comparable total chemical content, a more drastic action on the carbohydrate material will occur in the former case.

From Table II it is evident that at a total chemical of 50 per cent, the optimum sulphidity for delignification occurred at 100 per cent, corresponding to pure sodium sulphide. In Table III data are presented showing that the optimum sulphidity occurred in the neighborhood of 70 per cent at 35 per cent total chemical and of 80 per cent at 40 per cent total chemical. The data for 65 per cent total chemical are incomplete but it is evident that better pulping was realized at a sulphidity of 120 per cent, representing an excess of sodium hydrosulphide, than at 100 per cent and the higher value may be taken as more nearly representing the optimum. These data, together with those of Kress and McGregor *(3)* giving the optimum as 33 per cent sulphidity at 20 per cent total chemical and of Johansson *(4)* giving an optimum of 50 per cent at 26.7 per cent total chemical, are presented graphically in Fig. 1.

Apparently the value of the optimum sulphidity depends primarily on the total amount of NaOH and sodium sulphide present and is quite independent of other conditions, including the concentration of the liquor. The relationship is linear and from it may easily be derived the most desirable sulphidity when operating with any given amount of total chemical. Commercially, the sulphidity of a kraft liquor is limited by the efficiency of the soda recovery. Morevor, the total chemical used is limited by economic considerations to the range 18-28 per cent. The results indicate that sulphidities slightly higher

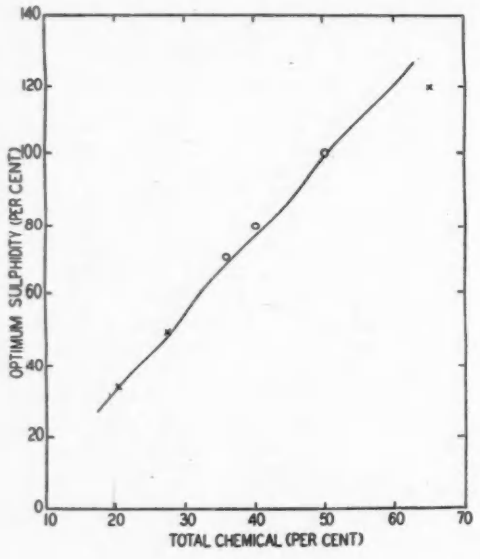

FIG. 1

The Relationship Between Total Chemical and Optimum Sulphidity in the Kraft Pulping Process

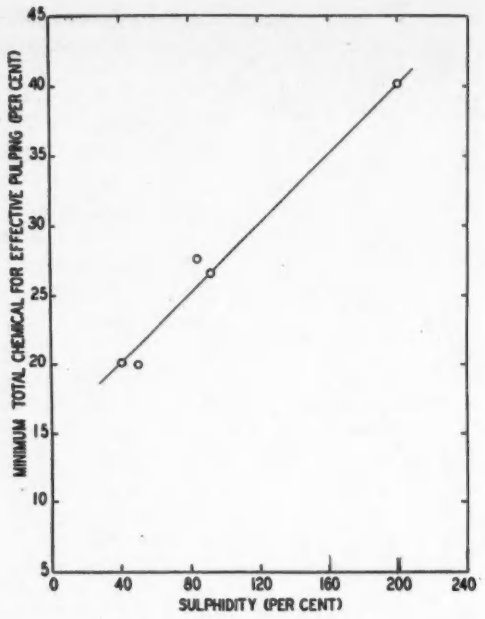

FIG. 2

The Minimum Amount of Chemical Necessary for Effective Pulping at Various Sulphidities

than those generally obtained should be more effective in this range.

The results of experiments reported in Tables IV and V show conclusively that it is possible to pulp wood completely with sodium hydrosulphide but that to do so, the total chemical required is in the neighborhood of 40 per cent (calculated as NaOH). The value "40 per cent" for hydrosulphide appears to be approximately equivalent to the value "20 per cent" for NaOH. The successful pulping of wood with sodium hydrosulphide makes it evident that a definite minimum of NaOH is not necessary to pulp wood completely with sulphide solutions. More fundamentally, successful pulping depends on the presence of a certain minimum of total chemical, this minimum increasing with the sulphidity. It further appears that the decrease in pulping power at high sulphidities, at constant total chemical, is likewise a consequence of the requirement for a higher total chemical as the hydrosulphide component is increased. Selecting the data of Kress and McGregor, the Institute, Johansson, and Klason as listed in Table I and using the value of 40 per cent in the case of pure sodium hydrosulphide, values for the minimum total chemical found necessary for complete pulping have been plotted against the attendant sulphidities in Fig. 2. Although defined with less precision and certainty than the relationship between optimum sulphidity and total chemical, a straight line relationship is again suggested.

In agreement with results reported by other investigators, the data of Tables IV to VIII show that the pulping action of sodium hydrosulphide involves the introduction of sulphur atoms into the lignin molecule. The experiments reported in Table IV indicated that longer cooking times as well as higher concentrations of hydrosulphide (or higher total chemical) were accompanied by an increase in the amount of sulphur found in the alkali lignin. This increase was not continuous, however, as a compari-

son of the results in Tables IV and V shows less sulphur in the alkali lignin recovered in experiments, where a relatively long cooking time at a higher temperature was employed. The data in Table VII, representing hydrosulphide cooks with very high total chemical at high liquor concentrations, show again a decrease in sulphur content of the alkali lignin from that obtained under less drastic conditions.

The results given in Table VI relative to the effect of sulphidity on the sulphur content of the alkali lignin recovered are shown graphically in Fig. 3. The sulphur content of the dissolved lignin increased with the sulphidity of the liquor, approaching a value in the neighborhood of 10 per cent with pure sodium hydrosulphide. This value approximates that found in Cook 33 (Table IV), namely, 10.72 per cent, which was the highest value for the sulphide content of the dissolved lignin found in any of the experiments made. Calculated on the basis of a molecular weight for lignin *(16)* of 850, this limiting value corresponds to the introduction of 3 sulphur atoms into the lignin molecule.

In Fig. 4 are plotted the data given in Table VIII showing the effect of cooking temperature on the sulphur content of the alkali lignin recovered from the hydrosulphide cooking liquor. At the lower temperatures studied, the increase in sulphur content with temperature is quite gradual, and the curve suggests an asymptotic relationship to some value between 3 and 4 per cent. Based on the lignin unit previously specified, the presence of one sulphur atom in the lignin molecule corresponds to a value of 3.6 per cent. It is reasonable to suppose the sodium hydrosulphide will not remove lignin without introducing at least one sulphur atom into the lignin molecule. A second and third sulphur atom were introduced gradually and perhaps progressively with increasing temperatures up to 160 deg. C., in the cooking time allowed.

The lower sulphur content observed above 160 deg. C. may be due either to a repression of the reaction,

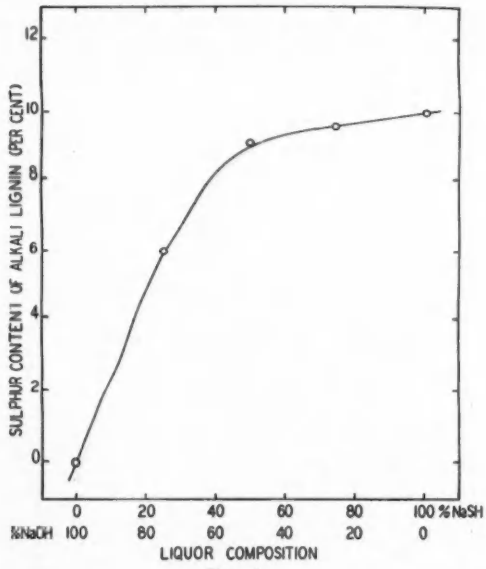

FIG. 3

The Effect of Liquor Composition on the Sulphur Content of the Lignin Dissolved

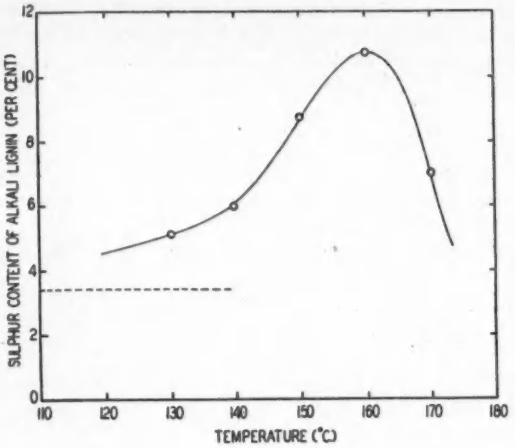

FIG. 4

The Effect of Temperature on the Sulphur Content of the Lignin Dissolved

whereby the sulphur enters the lignin molecule, or to an increased decomposition of the lignin-sulphur compound under these conditions. The latter effect seems much the more likely, especially in view of the rapid decrease evident here, and is in accord with the results of other experiments previously described, which showed that more drastic treatment from the standpoint of either concentration, time, or temperature could result in a recovered product of lower sulphur content. Presumably the liquor may continue to act on the lignin after its removal from the wood.

The fact that as many as three sulphur groups (based on the molecular conception of Brauns and Hibbert) can be introduced into the lignin molecule by a reaction with sodium hydrosulphide suggests that the reaction may involve a successive replacement of hydroxyl groups by hydrosulphide groups (Li represents a lignin residue):

$$LiOH + SH^- \leftrightharpoons LiSH + OH^- \quad (1)$$

It is postulated that the reactions whereby lignin becomes soluble in alkaline solutions are essentially of the type:

$$LiOH + Na^+ \leftrightharpoons LiONa + H^+ \quad (2)$$

$$LiSH + Na^+ \leftrightharpoons LiSNa + H^+ \quad (3)$$

The hydrogen ions whose formation is shown in the above may be removed from solution as either water or hydrogen sulphide depending on the chemical present, thus allowing the reaction to proceed in a forward direction. The dissociation of hydrogen sulphide being greater than that of water, the forward reaction rate and degree of completion of the solubilizing reaction should be greater in the presence of hydroxyl ions than under the influence of hydrosulphide alone. Consideration of the probable relative tendencies towards dissociation of the hydrogen from the hydroxyl and hydrosulphide groups in the lignin and modified lignin molecule leads to the proposition that the LiSH as postulated above should exhibit a greater reactivity with hydroxide than the LiOH, or, in other words, should be more readily soluble in alkali. Such considerations afford a basis for an explanation of the rapid pulping of kraft liquors.

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The TAPPI Graphic Arts Committee

Progress Report for 1940

By M. S. Kautrowitz[1]

This report of the Graphic Arts Committee covers its work for the past 6 month period beginning July 1, 1940.

Committee Membership

Since the appointment of a new Chairman to this Committee on July 1, 1940, several names have been added to its membership. The new members are K. P. Geohegan of the Aetna Paper Company, Dayton, Ohio, and H. B. Van Antwerp of the Carton and Container Ink Division, Sinclair and Valentine Co., New York City. It is felt that these men will render valuable service to the work of this committee.

In addition to the reorganization of the general committee, two subcommittees have been formed, one to develop methods for testing the printing qualities of paper, and another to prepare a bibliography on the graphic arts. The chairman of each subcommittee will be responsible for conducting the work assigned to that subcommittee.

Subcommittee on Testing Methods.

This subcommittee is under the chairmanship of W. F. Talbot, General Printing Ink Company, New York, N. Y. Its purpose is to develop methods for more definitely correlating the physical characteristics of paper with printing quality. Among these physical characteristics may be mentioned finish, (including smoothness or roughness of surface); ink receptivity, (including oil penetration and oil absorption); porosity or air permeability; surface strength or resistance to picking; formation; softness and compressibility; dusting and flaking of paper surfaces; expansivity and contractility; and moisture content.

Four methods for evaluating printing quality, namely porosity, oil penetration, smoothness, and surface strength, are now being studied by this subcommittee for promulgation.

Subcommittee on Bibliography

This subcommittee, under the Chairmanship of R. H. Simmons of the U. S. Government Printing Office, has been assigned to prepare a bibliography of the most important technical articles pertaining to the Graphic Arts published during the past ten years in the various trade magazines and list them under appropriate classifications. It is planned to prepare one such bibliography on the relationship of paper and ink to printing, and another bibliography on the various processes involved in printing. It is realized that such a project is of considerable magnitude. Articles pertaining to the Graphic Arts are now being published in approximately two hundred different publications or trade magazines. However, it is believed that, with the facilities of the Library of Congress and those of libraries of other Government Departments, this undertaking can be quite successfully accomplished.

Projects for Investigation.

In addition to the work already outlined, several projects are planned for future investigation, such as:

1. Continuation of the correlation of laboratory tests with printing qualities of paper.
2. Effects of humidity and temperature upon paper, ink, press rollers, and in printing processes.
3. Covering power of printing ink.

Program for TAPPI Annual Meeting, 1941.

In arranging for technical papers pertaining to the Graphic Arts for presentation at the Annual Meeting, only those which would be of special interest as constituting new developments in the field of printing and its allied trades were sought.

[1] Chairman TAPPI Graphic Arts Committee, Government Printing Office, Washington, D. C.

Japan Again Restricts Newsprint

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., January 6, 1941—A further restriction in Japan on the use of newsprint was recently imposed by the Ministry of Commerce and Industry. Effective from July 1, consumers of newsprint had their allotments reduced by 7½ per cent to 10 per cent from the previous quotas. Press reports also claim that the authorities will shortly impose drastic restrictions on the publication of weekly and monthly magazines and journals in a further effort to reduce paper consumption.

Production of foreign style paper by the members of the Japan Paper Manufacturers' Association reached 165,583,000 pounds during June, a gain of .7 per cent over the output of the previous month but a 4.1 per cent drop from the June 1939 production. Total production for the first six months of 1940 totalled 979,425,000 pounds, a decline of 1.3 per cent from the output during the first half of 1939.

Daylight Fluorescence Lamp For Fiber Analysis

By John H. Graff[1]

Abstract

A description is given of the use of the daylight fluorescence tubes for standard illumination and correct color differentiation under the microscope. With this light and the Color Atlas for Fiber Identification, fiber analysis is considerably simplified.

Some time ago the Institute of Paper Chemistry investigated the daylight fluorescence lamp as a source of light for color matching and found that samples compared under this light were almost the same as those viewed under overcast daylight.

The results of this investigation suggested that this type of illumination would be ideal for fiber analysis if mounted in a table stand in such a way that the light tube could be brought near enough to the mirror of the microscope to give the needed intensity of illumination.

A table lamp manufactured by the Van Dyke Industries, Chicago, Ill., and sold by the Graybar Electric Company, was selected. This lamp has an 18-inch daylight fluorescent tube, can be adjusted into many different positions, and is relatively inexpensive. Figure 1 shows the construction of the lamp and its position when used with the microscope.

The lamp gives excellent color differentiation for all fiber mixtures which have been examined; the results are better than those obtained with the variations of daylight under the best conditions of a clear northern sky at high noon. The intensity of the illumination is sufficient at a distance up to and including 12 inches between the tube and the mirror of the microscope. The lamp also has the advantage of serving as an ordinary desk light when not in use for microscopic analysis.

However, this construction necessitates an individual lamp for each analyst and therefore would not be practical either for the class room or where a number of analysts are working at the same time. To overcome this A. C. Brown of the Wisconsin-Michigan Power Company and the author designed a lamp, shown in Fig. 2, which has two 48-inch fluorescent tubes and which can be used by four workers at the same time.

[1] Member of TAPPI. Research Associate, the Institute of Paper Chemistry, Appleton, Wis.

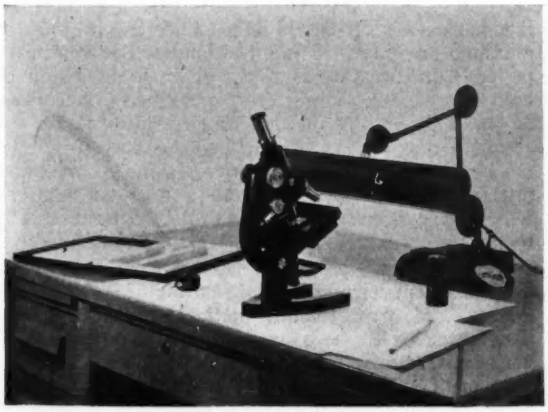

FIG. 1

FIG. 2

This arrangement has been used with the regular class in Fiber Microscopy at The Institute of Paper Chemistry and also with the students of the TAPPI summer seminar in fiber analysis, all of whom agreed that the light made fiber analysis much easier because of the exact color differentiations obtained when the mirror and the condenser of the microscope had been properly set.

Considering the fact that exact fiber analysis requires very fine color differentiations, that very few laboratories are so situated that they have an unobstructed view of a northern sky, and that the best northern light varies constantly, the following summary may be given regarding the use of the daylight fluorescence lamp for fiber analysis: absolute correct color differentiation is assured; the intensity of the light, even for the 18-inch tube, is strong enough up to a distance of 12 inches from the mirror of the microscope; a standard light source may be had at all hours of the day; the results with this lamp should be absolutely comparable regardless of where the analysis is made; less strain and fatigue result than when working under variable daylight; the life of the fluorescence tube is long and the replacement cost is small; with this light and the Color Atlas for Fiber Identification, fiber analysis is considerably simplified.

Installs Swedish Paper Machine

WASHINGTON, D. C., January 6, 1941—A new Swedish paper machine of 14 tons daily capacity was recently installed at the Maracay mill, according to a report from the American Commercial Attache, Caracas, Venezuela. With the installation of the new equipment, the mill's operating capacity will be increased to 5,000 tons per year.

The TAPPI Paper Testing Committee

Progress Report 1940-1941

By B. W. Scribner[1]

The organization of the committee remained as before except that two subcommittees were discontinued. The Microscopic Subcommittee was discontinued because its functions were transferred to the new Microscopic Analysis Committee. The Water Vapor Permeability Subcommittee was discontinued because of completion of its work which culminated in a tentative standard method.

Status of Projects

PHYSICAL PROPERTIES

Revisions of the methods for sampling, T 400 m, folding endurance, T 423 m, and conditioning paper for test, T 402 m, were approved by the Standards Committee. In the revised method for folding endurance, both the Schopper and the M. I. T. types of instruments are included as standards. The important changes in the method for conditioning are specification of 50% relative humidity and 73 deg. F. as the standard atmospheric conditions. The change to 50% relative humidity was recommended by the Paper Testing Committee because surveys made by the American Pulp and Paper Association, the Technical Association of the Pulp and Paper Industry, and the Newsprint Manufacturers Association showed that there was a preponderating sentiment in these associations in favor of the change. The temperature was increased to make the standard humidity easier to maintain and to make the testing conditions more comfortable for the testing personnel. The methods for sampling and folding endurance appeared in the following issues, respectively, of the *Paper Trade Journal*: June 20, August 15, 1940.

The new methods approved by the Standards Committee comprise moisture expansivity, T 447 m; water vapor permeability, T 448 m; rigidity, stiffness and softness, T 451 m; and creasing quality, T 446 sm. The method for expansivity is based on the apparatus developed by C. G. Weber and M. N. V. Geib at the National Bureau of Standards. The method for water vapor permeability was developed after several years of subcommittee work under the direction successively of Allen Abrams and G. Brabender, Marathon Paper Mills Company. The successful completion of this development project marks a very distinct accomplishment on the part of the technicians who participated in the investigative work, which included cooperative laboratory testing. Most all of the sheet materials commonly used for wrapping food products were included in the investigation and assistance was received from technicians experienced in the problem as related to such products as a whole. This development has attracted the attention of a large variety of interests, particularly manufacturers and users of packaging materials, educational and scientific institutions, and consulting engineers. Study to improve the testing procedure is being made at the Institute of Paper Chemistry. The method for rigidity, stiffness, and softness and the method for creasing quality were based on methods developed by J. d'A. Clark in the laboratory of the Scott Paper Company. The former was chosen over several methods available, as a result of investigative work at the Institute of Paper Chemistry. The method for creasing quality is intended particularly for determining the ability of wrappers to remain in position after being folded by mechanical wrapping equipment. The method for moisture expansivity was published in the March 28, 1940, issue of *Paper Trade Journal*, the method for water vapor permeability in the March 28, 1940, issue, and the method for rigidity, stiffness and softness in the November 28, 1940, issue.

The following revisions of physical methods are in progress: tensile breaking strength, bursting strength, and thickness. Methods are being developed for identification of wire side and felt side, paraffin absorptiveness, and writing quality.

CHEMICAL PROPERTIES

Revisions of the methods for paraffin, T 405 m; ash, T 413 m; and moisture, T 412 m; were approved by the Standards Committee, and they were published in the following issues, respectively, of *Paper Trade Journal*: May 23, May 30, August 22, 1940. An important change in the method for moisture is inclusion of details for finding the amount of moisture in deliveries. Heretofore, the method was applicable only to finding the moisture content of test specimens for calculation of results of chemical tests on a moisture-free basis.

A new method approved by the Standards Committee is for determination of the amount of pentosans. This is based on a modified procedure developed by H. F. Launer at the National Bureau of Standards. It was published in *Paper Trade Journal*, October 31, 1940.

Revision of the method for hydrogen ion concentration is in progress. Several investigators have shown that when the present TAPPI procedure of hot extraction is used, aluminum salts are hydrolyzed causing a pH value that is lower than the true value. The Paper Testing Committee considered a modified method proposed by H. F. Launer in which cold extraction is used, but several members hold the view that hot extraction should be used because it gives the maximum acidity that might ultimately develop in the paper. Consideration is being given to inclusion of both ways of extracting the paper, then either could be used, depending on the kind of information desired.

The committee completed 6 revisions of methods, not including minor ones, and 5 new ones, all of which have been adopted by the Association. The total number of Association paper testing methods is now 52.

The system set up for coordination of TAPPI and A. S. T. M. paper testing methods through a Joint Committee of the two organizations has functioned very satisfactorily. The A. S. T. M. has adopted a number of TAPPI methods either without change or after revision made jointly by the paper testing committees of the organizations.

[1] Chairman, TAPPI Paper Testing Committee, U. S. Bureau of Standards, Washington, D. C.

Imports of Paper and Paper Making Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard; Bleached Sulphite More Acute—Some Grades of Old Waste Lower.

Effective September 30, 1939, under Treasury Decision 49,970, all publications, exchanges and trade associations, were denied access to import manifests at the New York Customs House. The Paper Trade Journal and other interested parties have vigorously protested this ruling, and as soon as the order of the Treasury Department is modified or rescinded, full publication of all manifests will be resumed in these columns. In the interim, the Paper Trade Journal is making every possible effort to gather all available information from manifests, at various outside sources.

NEW YORK IMPORTS

WEEK ENDING JANUARY 4, 1941

SUMMARY

Cigarette paper .....615 bbls.
Wall paper .....2 bls.
Newsprint .....353 rolls
Wrapping paper .....1,315 rolls, 967 bls.
Drawing paper .....21 cs.
Filter paper .....35 cs.
Tracing paper .....42 cs.
Tissue paper .....11 cs.
Decalcomania paper .....59 cs.
Cellophane paper .....4 cs.
Carbon paper .....24 casks
Pasteboard .....26 crates
Miscellaneous paper .....84 cs.

CIGARETTE PAPER

Brown Williamson Tobacco Co., ——, Petsamo, 615 bbls.

WALL PAPER

F. J. Emmerich, ——, Liverpool, 2 bls.

NEWSPRINT

Jay Madden Corp., ——, Petsamo, 353 rolls.

WRAPPING PAPER

R. L. Stevens, ——, Petsamo, 616 rolls, 455 bls.
Sharp Paper Specialty Co., ——, Petsamo, 100 rolls, 70 bls.
Chase National Bank, ——, Petsamo, 224 bls.
Walker Goulard Plehn Co., ——, Petsamo, 599 rolls, 218 bls.

DRAWING PAPER

H. Reeve Angel & Co., Inc., ——, Liverpool, 21 cs.

FILTER PAPER

H. Reeve Angel & Co., Inc., ——, Liverpool, 35 cs.

TRACING PAPER

Dingelstedt & Co., ——, Liverpool, 42 cs.

TISSUE PAPER

Remington, Rand, Inc., ——, Kobe, 3 cs.
F. C. Strype, ——, Liverpool, 8 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., ——, Liverpool, 49 cs. (duplex), 5 cs. (simplex).
——, ——, Liverpool, 5 cs.

CELLOPHANE PAPER

Sherwin Bros., ——, Yokohama, 4 cs.

CARBON PAPER

——, ——, Liverpool, 24 casks.

PASTEBOARD

——, ——, Oporto, 26 crates.

MISCELLANEOUS PAPER

Corn Exchange Bank Trust Co., ——, Kobe, 38 cs.
Remington, Rand, Inc., ——, Kobe, 1 cs.
National City Bank, ——, Kobe, 45 cs.

RAGS, BAGGINGS, ETC.

D. Galloway, ——, Yokohama, 50 bls. cotton waste.
——, ——, Liverpool, 59 bls. old rags.

HIDE CUTTINGS

——, ——, Liverpool, 180 bags.

GLUE STOCK

Darmstadt Scott & Courtney, ——, Buenos Aires, 95 bls.

CASEIN

Packing Products Co., ——, Buenos Aires, 334 bags, 20040 kilos.

WOOD PULP

Pulp Sales Corp., ——, Petsamo, 1925 bls. prime strong sulphite, 341 tons; 3534 bls. prime strong sulphate, 708 tons.
Halifax Power & Pulp Co., ——, Sheet Harbor, 3895 bls. wood pulp.

PHILADELPHIA IMPORTS

WEEK ENDING JANUARY 4, 1940

Halifax Power & Pulp Co., ——, Sheet Harbor, 6090 bls. wood pulp.

LOS ANGELES IMPORTS

WEEK ENDING JANUARY 4, 1940

——, ——, Ocean Falls, 3610 pkgs. newsprint, 700 bls. ground bleached wood pulp, 85 tons.
——, ——, Osaka, 1 cs. parchment paper.

Fibercote to Display Magazines

A new line of leatherette and woodgrain display and covering materials with baked-oil-enamel surface has been announced by E. W. Pitt, display sales manager of the Sherman Paper Products Corporation. Fibercote makes its bow in three fields—as a display material, as a low-priced covering material for packaging and as a utility shelf and table covering. Among the advantages claimed for this new product is a waterproof and grease-proof surface that will withstand repeated washings. This surface is an oil enamel coating baked from 6 to 8 hours on a fiber craft base stock, so flexible that it will not crack in folding.

Eighteen colors are available, with leatherette embossing, together with 6 woodgrain designs. Standard roll size is 50 inches wide by 25 feet long, while special sizes of sheets and rolls are also available. For convenience in cutting, the back of Fibertone stock has inch, and half-inch markings. The new line will be distributed nationally through display and paper jobbers.

Coated White Back Cover

The McLaurin-Jones Company has recently offered its Old Tavern gold and platinum casein coated cover papers with a beautiful smooth, white coated back. This white coating offers a fine finish, and an outstanding appearance for printing on the back as well as on the front. It permits fine screen reproductions on both sides, and has many of the virtues of the costlier pyroxylin coating. It is highly satisfactory for covers, display cards, menus, programs, announcements, and inserts. Samples of the new, white coated back Old Tavern gold and platinum papers may be secured through a long list of McLaurin-Jones distributors, or from the mill direct at Brookfield, Mass.

New York Paper and Pulp Market Review

Paper Market Reflecting Seasonal Lull Over Holidays and Mid-Year Inventory Taking Period—Pulp Markets Quiet—Rag Market Reported Steady — Higher Grades of Old Waste Paper Very Firm.

Office of the PAPER TRADE JOURNAL,
Wednesday, January 8, 1941.

Sales volume in many lines of paper leveled off seasonally during the holidays and the production of mills declined sharply as usual as most plants shut down. Reports from many manufacturers' representatives, jobbers, and general paper merchants this week reflect an optimistic view of the future course of business. An increasing number of inquiries are now being received, indicating a broadening demand and a more active paper market is expected soon.

The index of general business activity declined to 114.2 per cent for the week ended December 28, from 115.6 per cent for the preceding week, compared with 106.8 per cent for the corresponding week for 1939.

Paper production for the week ended December 28 was estimated at 64.4 per cent, compared with 76.2 per cent for 1939, with 63.9 per cent for 1938, with 48.6 per cent for 1937 and with 66.5 per cent for the corresponding week for 1936.

Paper board production for the week ended December 28 was 48.0 per cent, compared with 46.0 per cent for 1939, with 35.0 per cent for 1938, with 48.0 per cent for 1937 and with 63.0 per cent for the corresponding week for 1936.

Demand for kraft paper continues good and with the prospect of increasing volume. No definite uptrend in orders for other grades of paper is reflected in reports received this week. The paper market continues to show firmness, with no important changes in prices reported at this date. Inventories at the mills and general paper merchants' stocks are reported as favorable for a rapid increase in activity. The price situation, as in most other lines, is uncertain and the possibility of higher taxes, regulation of reproduction and other government controls, make the future conduct of business appear at variance with the normal state of trade.

Mechanical Pulp

No important change in the market situation of mechanical pulp has been reported this week. This market is seasonally quiet, with prevailing quotations holding firm.

Chemical Pulp

The chemical pulp market is quiet at this date. Prices are firm. Prime grades of unbleached sulphite and northern kraft pulps continue to reflect a strong position. The news grade of unbleached sulphite, light and strong kraft and No. 1 kraft pulp continue to reflect a strong uptrend to higher levels, but no important change in the prices of any grade of pulp has been reported at this date.

Rags

Demands for rags continues steady and an increase in volume is expected in the trade at an early date. Prices are firm and no important change has been reported this week on any grade of new or old rags.

Old Rope and Bagging

Seasonal tapering off during the holidays and inventory-taking period, is reflected in trading in the old rope market at this date. Prices are firm and no important changes have been reported at this date.

Trading in old bagging is slow. Prices are firm and unchanged.

Old Waste Paper

The paper stock market, like other markets, is reflecting the seasonal lull of the holidays and the mid-season closing down of mills for annual inventories. Prices are well maintained and the higher grades of old waste paper are decidedly firm. No important change from prevailing market quotations has been reported this week.

Twine

No important change in demand or prices has been reported in the twine market during the current week. Prices are firm on all standard grades of hard and soft fiber twines.

New Sheet Size Tester

A recent development in paper testing devices is the "Mamco" sheet size tester which has been designed to make the testing of sheets for squareness and size a simple and rapid procedure. Both the length and width are instantly indicated on the horizontal and vertical scales. The tester stands upright and will handle a sheet 56 x 74 inches high.

The cutter or layboy operator simply steps on a treadle at the base of the tester, which opens the holding fingers and permits the sheet to be placed into position against the straight edge of the horizontal scale, with the upper left corner of the sheet at 0. As all scales are accurately graduated, the length and width as well as the squareness of the sheet are determined at a glance.

Friction Material for Special Applications

Condor Industrial Friction Material is now being manufactured in special types for application on construction equipment, such as shovels, draglines, and cranes, and on plant equipment, including bridge cranes, bucket and clam shell cranes, and hoists, according to an announcement by the Manhattan Rubber Manufacturing Division, Passaic, N. J.

The Condor line, according to the manufacturer, is complete as it covers various styles and types of friction material in several frictional values. Through its completeness proper materials are available not only for standard conditions but also for non-standard and unusual operating conditions. It is manufactured in a wide range of sizes and shapes to take care of all installations.

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APPLETON FELTS make good paper

MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Wednesday, January 8, 1941.

BLANC FIXE—Prices on blanc fixe are firm and unchanged and conform to prevailing market levels. The pulp is currently quoted at $35 per ton, in barrels, at works; the powder is currently quoted at $50 per ton, f.o.b., works. Demand reported moderate for the week.

BLEACHING POWDER—Quotations on bleaching powder are firm. Demand reported steady for the week. Bleaching powder is currently quoted at $2 per 100 pounds, in drums, at works.

CASEIN—Prices on casein are firm and unchanged for the current week. Standard domestic casein, 20-30 mesh, is currently quoted at 13 cents per pound; 80-100 mesh, at 13½ cents per pound. All prices in bags, car lots. Argentina casein, 20-30 mesh, is currently offered at 12½ cents per pound. No quotations on French casein.

CAUSTIC SODA—Quotations on caustic soda are firm and continue unchanged at prevailing market prices. Shipments reported fair. Solid caustic soda is currently quoted at $2.30 per 100-pounds; flake and ground at $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—Prices on china clay are firm and conform to prevailing market levels. Demand reported moderate at this date. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay at from $12 to $22 per ton, at mines. Imported clay is currently offered at from $13 to $25 per ton, ship side.

CHLORINE—Quotations on chlorine are firm and unchanged. Market strong. Demand reported steady for the current week. Chlorine is currently quoted at $1.75 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The rosin market is reported firm for the week with prices higher on some grades. "G" gum rosin is currently quoted at $1.71 per 100 pounds, in barrels, Savannah "FF" wood rosin is currently quoted at $1.54 per 100 pounds, in barrels, New York. Seventy per cent gum rosin size is quoted at $2.44 per 100 pounds, f.o.b., works.

SALT CAKE—Prices on salt cake are firm and nominal. Shipments steady. Domestic salt cake is currently quoted at $17 per ton, in bulk; chrome cake at $16 per ton. All prices in car lots, f.o.b., shipping point. The quotation of $16.50 per ton on imported salt cake is nominal.

SODA ASH—Quotations on soda ash are firm and continue to conform to prevailing market levels. Demand reported moderate for the week. Prices on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Prices on corn starch are firm and continue unchanged for the current week. Pearl is currently quoted at $2.95 per 100 pounds; powdered starch at $3.05 per 100 pounds. All prices in bags, car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina are firm. Demand reported good for the current week. The commercial grades are currently quoted at $1.15; iron free at $1.60 per 100 pounds. All prices in bags, car lots, f.o.b., works.

SULPHUR—Prices on sulphur are firm and conform to prevailing market levels. Annual contracts are currently quoted at $16 per long ton, f.o.b., mines. Spot and nearby car lots are quoted at $19 per ton.

TALC—Quotations on talc are firm and continue unchanged at prevailing market prices. Domestic talc is currently quoted at from $15 to $21 per ton, at mines. No quotations on imported talc.

MARKET QUOTATIONS

Paper

(Delivered New York)

News, per ton—
Roll, contract....$50.00 @ —
Sheets 58.00

Kraft—per cwt.—Delivered Zone A
Northern, Extra Quality .....$5.25 @$5.75
Superstandard .... 4.87½" 5.25
Northern Standard Wrapping ..... 4.37½" 4.62½
Standard Wrapping 4.25 " —

Tissues—Per Ream—Carlots
White No. 1..... .97½" —
White No. 1 M. G. .95 " —
White No. 1½.... .80 " —
White No. 2..... .75 " —
Anti-Tarnish M. G. .80 " —
Colored ..... .85 " —
Kraft ..... .87½" —
Manila ..... .77½" —
Unbl. Toilet, 1 M.. 3.75 " —
Bleached Toilet.... 5.26 " —

Paper Towels, Per Case—
Unbleached, Jr..... 2.10 " —
Bleached, Jr..... 3.60 " —

Manila—per cwt.—C. l. f. a.
No. 1 Jute..... 8.25 @10.25
No. 1 Manila Wrapping, 35 lb..... 3.25 " —
No. 2 Manila Wrapping, 35 lb..... 3.00 " —

Boards, per ton—
News .....35.00 @40.00
Chip ....
Sgl. Mla. Ll. Chip.52.50 " 55.00
White Pat. Coated.65.00 " 67.50
Kraft Liners.....55.00 " —
Binders Boards....73.00 " 80.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext. No. 1.	$39.10@$46.00	$40.25@$47.25
100% Rag	31.05 " 36.50	32.20 " 37.75
85% Rag	.... "	29.90 " 35.00
75% Rag	23.60 " 27.75	24.75 " 29.00
65% Rag	.... "	21.65 " 26.25
50% Rag	17.55 " 21.50	18.70 " 22.75
25% Rag	14.65 " 17.75	15.80 " 19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$9.35@$11.50	$11.55@$12.75
No. 2	8.50 " 10.25	9.65 " 11.75
No. 3	8.05 " 9.25	9.20 " 11.25
No. 4	7.70 " 9.50	8.90 " 10.75

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper, Delivered in Zone 1:

No. 1 Glossy Coated	$11.90@$13.50
No. 2 Glossy Coated	10.35 " 11.75
No. 3 Glossy Coated	9.55 " 11.00
No. 4 Glossy Coated	9.15 " 10.50
No. 1 Antique (watermarked)	9.05 "$10.50
No. 2 Offset	8.40 " 9.75
A Grade E. F.	8.20 " 9.50
A Grade S. & S. C.	8.45 " 9.75
B Grade E. F.	7.65 " 8.75
B Grade S. & S. C.	7.90 " 9.00
C Grade E. F.	7.35 " 8.50
C Grade S. & S. C.	7.60 " 8.75
D Grade E. F.	7.10 " 8.25
D Grade S. & S. C.	7.35 " 8.50

Ivory & India at $.50 cwt. extra

Mechanical Pulp

(On Dock, Atlanta Ports)

No. 1 Imported—
Moist ..... No prices
Dry ..... No prices

(Delivered)

No. 1 Domestic and Canadian .....40.00 @42.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—
Prime Bleached Sulphite ..... 3.72½ @ 3.87½

Prime Qualities—
Easy-Bleaching Sulphite ..... 3.17½" 3.75

Strong Unbleached Sulphite ..... 3.17½" 3.75

News Grade, delivered
Unbleached Sulphite .....58.00 " 63.75

(On Dock, Atlantic Ports)

Kraft Bleached ... 4.12½"
Kraft Light & Strong 3.50 " 3.90
Kraft No. 1..... 3.40 " 3.80

(On Dock, Pulp Mill)
Kraft Domestic and Canadian ..... 2.75 " 3.37½

(Delivered)

Soda Bleached ..... 3.30 " —

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.

Shirt Cuttings—
New White, No. 1. 6.50 @ 6.75
Silesias No. 1..... 4.50 " 4.65
New Unbleached.. 6.25 " 6.50
Blue Overall ..... 4.15 " 4.50
Fancy ..... 3.25 " 3.50
Washables ..... 2.00 " 2.15
Mixed Khaki Cuttings ..... 2.75 " 3.00
O. D. Khaki Cuttings 3.00 " 3.15

Old Rags

White, No. 1—
Repacked ..... 3.50 " 3.65
Miscellaneous .... 2.75 " 3.00

White, No. 2—
Repacked ..... 2.50 " 2.75
Miscellaneous .... 2.00 " 2.25

Thirds and Blues—
Repacked ..... 1.50 " 1.65
Miscellaneous .... 1.10 " 1.25

Roofing Rags—
No. 1..... 1.15 " 1.20
No. 2..... 1.00 " 1.05
No. 3 (bagging)... .90 " 1.00
No. 4..... .60 " .65
No. 5A..... .60 " .65

Foreign Rags

All prices nominal

New Rags

New Dark Cuttings.. 2.25 @ 2.40
New Mixed Cuttings. 2.00 " 2.20
New Light Silesias.. 5.50 " 5.75
Light Flannelettes... 5.50 " 5.75
New White Cuttings. 7.00 " 7.50
New Light Oxford.. 4.00 " 4.50
New Light Prints... 3.00 " 3.25

Old Rags

No. 1 White Linens. 7.50 " 8.50
No. 2 White Linens. 6.50 " 7.50
No. 3 White Linens. 4.50 " —

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No. 1 White Cotton.	4.25	"	4.75
No. 2 White Cotton.	3.25	"	3.75
No. 3 White Cotton.	2.50	"	3.00
No. 4 White Cotton.	1.90	"	2.20
Extra Light Prints..	2.00	"	2.40
Ord. Light Prints...	1.75	"	2.15
Med. Light Prints...	1.55	"	1.95
Dutch Blue Cottons.	2.25	"	2.50
French Blue Linens.	3.00	"	—
Checks and Blues...	2.00	"	—
Linsey Garments....	1.90	"	2.00
Dark Cottons.....	1.50	"	1.60
Old Shopperies.....	1.30	"	1.45
New Shopperies.....	1.45	"	1.50
French Blues.....	2.25	"	2.50

Old Rope and Bagging

(Prices to Mill, f. o .b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	2.50	"	2.75
Wool Tares, light...	2.00	"	2.25
Wool Tares, heavy..	2.12½	"	2.25
Bright Bagging	2.25	"	2.50
Manila Rope—			
Foreign	5.25	"	5.50
Domestic	5.25	"	5.50
Jute Threads.....	2.75	"	3.00
Sisal Strings.....	2.10	"	2.35
Mixed Strings.....	1.10	"	1.20

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	3.10	@	3.25
Ordinary Hard White No. 1....	2.25	"	2.50
Soft White No. 1..	1.80	"	1.90
Soft White Extra..	2.50	"	2.60
Flat Stock—			
Stitchless	1.10	"	1.25
Overissue Mag.....	.90	"	1.00
Solid Flat Book...	.80	"	.85
Crumbled No. 1...	.70	"	.75
Ledger White Stock.	1.70	"	1.75
Ledger Stock Colored	1.30	"	1.40
Manila—			
New Env. Cut....	1.70	"	1.80
New Cuttings.....	1.30	"	1.40
Old Kraft Machine Compressed bales..	1.40	"	1.50
News—			
No. 1 White News	1.75	"	1.90
Strictly Overissue.	.70	"	.75
Strictly Folded....	.45	"	.50
Corrugated	.40	"	.45
No. 1 Mixed Paper..	.25	"	.30

Twines

(F. o. b. Mill)

(Soft Fiber)			
Coarse Polished—			
India	.18	@	—
White Hemp.....	.18	"	—
Fine Polished—			
Fine India.....	.22	"	—
Unpolished—			
Box	.16	"	—
Paper Makers.....	.13	"	—
Tube Rope.....	.14½	"	—
Wall Paper.....	.16	"	—
Wrapping	.16	"	—
Soft Fiber Rope...	.14	"	—
Cotton	.24	"	—
(Hard Fiber)			
Medium Java.....	.10	"	—
Mex. Sisal.....	.09½	"	—
Manila	.23	"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f.o.b. Phila.)

Shirt Cuttings—			
New White No. 1.	.06½	@	.07
New White No. 2.	.03½	"	.04
Light Silesias.....	—	"	.04½
Silesias, No. 1....	—	"	.04
Black Silesias, soft	—	"	.03
New Unbleached...	.06	"	.06¼
Washable Prints...	.02¼	"	.02½
Washable, No. 1..	—	"	.01½
Blue Overall.....	.04	"	.04½
Cottons—According to grades—			
Washable shredding	—	"	.01½
Fancy Percales....	—	"	.03
New Black Soft...	.02½	"	.02¾
New Light Seconds	—	"	.04
New Dark Seconds	—	"	1.50
Khaki Cuttings—			
No. 1 O. D.....	.03½	"	.03¾
No. 2 Mixed.....	.01¾	"	.02
Corduroy	.01¾	"	.01½
New Canvas.....	.04½	"	.05
New Black Mixed.	—	"	.02¾

Domestic Rags (Old)

White No. 1—			
Repacked	3.00	@	3.50
Miscellaneous	2.75	"	3.00
Thirds and Blues—			
Miscellaneous	1.35	"	1.50
Repacked	1.55	"	1.65
Black Stockings (Paper) ...	3.50	"	4.00
Roofing Stock—			
Foreign No. 1.....	Nominal		
Domestic No. 1...	1.20	"	1.25
Domestic No. 2...	1.00	"	1.05
Roofing Bagging..	.90	"	.95

Bagging

(f.o.b. Phila.)

Gunny, No. 1—			
Foreign	Nominal		
Domestic	2.25	@	2.50
Manila Rope.....	—	"	5.50
Sisal Rope.....	2.00	"	2.25
Mixed Rope.....	.75	"	1.00
Scrap—			
No. 1.....	2.55	"	2.75
No. 2.....	—	"	1.50
Wool Tares, heavy..	3.75	"	4.00
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	2.25	"	2.50

Old Papers

(f.o.b. Phila.)

Shavings—			
No. 1 Hard White	2.40	@	2.50
No. 2 Hard White	2.10	"	2.15
No. 1 Soft White	1.90	"	2.00
No. 2 Soft White	1.60	"	1.75
No. 1 Mixed.....	.90	"	1.00
Solid Ledger Stock..	1.90	"	2.00
Ledger Stock, white.	1.50	"	1.60
Ledger Stock, colored	1.10	"	1.15
No. 1 Books, heavy..	.80	"	.85
Manila Cuttings.....	1.75	"	1.80
Print Manila.....	.50	"	.55
Container Manila....	.40	"	.45
Kraft Paper.....	1.25	"	1.30
No. 1 Mixed Paper..	.25	"	.30
Straw Board Chip...	.30	"	.35
Binders Board Chip..	.30	"	.35
Corrugated Board...	.50	"	.60
Overissue News.....	.70	"	.75
Old Newspapers.....	.50	"	.55

BOSTON

Old Papers

(f.o.b. Boston)

Shavings—			
No. 1 Hard White	2.75	@	3.00
No. 1 Soft White	2.00	"	2.25
No. 2 Mixed.....	.75	"	.80
Solid Ledger Books..	1.50	"	1.75
Overissue Ledger Stock	1.75	"	2.00
Mixed Ledgers.....	1.50	"	1.75
No. 1 Heavy Books	1.10	"	1.20
No. 1 Books, Light..	.75	"	.85
Crumpled Stitchless Book Stock.....	.75	"	.85
Manila Env. Cuttings	1.85	"	2.00
Manila Envelope Cuttings extra quality	2.35	"	2.60
Print Manila News	—	@	—
No. 1 Kraft.....	1.25	"	1.30
Extra No. 1 Kraft..	1.45	"	1.50
Mixed Papers.....	.30	"	—
Print Manila.....	.55	"	.60
Container Manila ..	.60	"	.65
Old Newspapers.....	.50	"	.55
Paper Wool Strings.	.95	"	1.10
Overissue News.....	1.00	"	1.10
Box Board Chips....	.40	"	.45
Corrugated Boxes...	.45	"	.50
Kraft corrugated boxes	.85	"	.95
New Kraft Corrugated Cuttings	1.35	"	1.40
Screening Wrappers.	.70	"	.80

Bagging

(f.o.b. Boston)

Gunny Bagging—			
Foreign	2.90	@	—
Domestic	2.75	"	3.00
Sisal Rope.....	2.50	"	2.60
Mixed Rope			
Transmission Rope—			
Foreign	2.50	"	2.60
Domestic	2.50	"	2.60
Soft Jute Rope.....	3.25	"	3.50
Manila Rope—			
Foreign	5.25	"	5.35
Domestic	5.50	"	5.75
Jute Carpet Threads	2.00	"	2.25
Bleachery Burlap....	4.00	"	5.25
Scrap Burlap—			
Foreign	2.60	"	2.65
Domestic	2.50	"	2.60
Scrap Sisal.....	2.50	"	2.60
Scrap Sisal for Shredding	2.30	"	2.65
Wool Tares—			
Foreign, Heavy...	2.40	"	2.50
Domestic	2.40	"	2.50
Aust. Wool Pouches.	2.75	"	3.00
New Burlap Cuttings	3.75	"	4.00
Heavy baling bagging	2.75	"	3.00
Paper Mill Bagging..	1.75	"	2.00
No. 2 Bagging.....	.75	"	.80

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints.	—	@	.03
Fancy Percales....	.04	"	.04¼
New White No. 1.	.06¾	"	.07
New Light Flannelettes	.05	"	.05¼
Canton Flannel, Bleached	.06¼	"	.06½
Underwear Cutters, Bleached	.06	"	.06½
Silesias, No. 1			
New Black Silesias..	3.00	"	3.25
Red Cotton Cuttings	.04	"	.05
Soft Unbleached...	.06	"	.06½
Blue Cheviots.....	.04¼	"	.04½
Fancy	.04	"	.04½
Washable	.02	"	.02½
Cottons—According to Grades—			
Blue Overalls.....	.04¼	"	.05
New Black, Soft..	.03	"	.03¼
Khaki Cuttings....	.02½	"	.03
O. D. Khaki.....	.02½	"	.03¼
Corduroy	.04	"	.04½
New Canvas			
B. V. D. Cuttings...	.06½	"	.06¾

Domestic Rags (Old)

(F. o.b. Boston)

White No. 1—			
Repacked	2.75	"	3.75
Miscellaneous	2.40	"	2.60
White No. 2—			
Repacked	1.90	"	2.00
Miscellaneous	2.00	"	2.00
Twos and Blues.....	2.00	"	2.25
No. 1 Blue Overalls	.60	"	.65
Thirds and Blues—	1.50	"	1.75
Miscellaneous	1.25	"	1.35
Black Stockings.....	3.50	"	4.00
Roofing Stock—			
No. 1.....	1.20	"	1.30
No. 2.....	.95	"	1.00
No. 3.....	.85	"	.95

Foreign Rags

(F. o. b. Boston

Canvas	.04¼	@	—
Dark Cottons.....	(nominal)		
Dutch Blues.....	(nominal)		
New Checks and Blues	(nominal)		
Old Fustians.....	(nominal)		
Old Linsey Garments.	(nominal)		
New Silesias.....	(nominal)		

CHICAGO

Waste Paper

(f.o.b. Chicago)

Shavings—			
No. 1 White Envelope cuttings....	3.15	@	—
No. 1 Hard White	2.50	"	2.65
No. 1 Soft White.	2.00	"	2.20
Ledger and Writings	.85	"	.95
Solid Books.....	.95	"	1.10
Blanks	1.50	"	1.60
Krafts	1.40	"	1.50
New Kraft Cuts.....	1.60	"	1.75
Overissue News.....	1.00	"	1.10
Old Newspapers—			
No. 1 Folded News	.70	"	.80
No. 1 Mixed Paper	.40	"	.50
Roofing Stocks—			
No. 1.....	.95	@	1.00
No. 2.....	.85	"	.90

Murray "Grid" Condensers

Available in a wide range of sizes and combinations for installations to maintain the required uniform boiler room temperatures for draft purpose and uniform air movement without stratification, Murray "Grid" condensers, manufactured by D. J. Murray Mfg. Company, Wausau, Wis., are especially adaptable for steam power plants. As shown here, they can be installed in the window spaces, or in walls, without taking up floor space.

Murray "Grid" condensers are immune to atmospheric corrosion due to contamination of the air from sulphur and sulphides and other products of combustion. No electrolysis can develop in them, as the supply and return lines and the steam chambers are of one type metal, so that only one type metal is in contact with steam, thus preventing electrolytic action. The heating sections of Murray "Grid" condensers are easy to keep clean under all atmospheric conditions, as there are no tortuous air steam passages to get plugged up. Their open design makes them practically self-cleaning, and their rugged construction insures against vibration failures. The manufacturer states that "Grid" condensers were developed after years of service in the "Grid" unit heater in power plants and other high pressure steam plants.